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# Digital Inclusion

## Report of Online Behaviours in Australia 2016

Prepared for Australia Post

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August 2016

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# Digital inclusion: Report of online behaviours in Australia 2016

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# Table of Contents

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<b>Executive summary</b> .....	<b>5</b>
<b>1. Introduction</b> .....	<b>7</b>
<b>1.1. Background</b> .....	<b>7</b>
<b>1.2. Aim</b> .....	<b>9</b>
<b>1.3. Ethics</b> .....	<b>9</b>
<b>1.4. Reading this report</b> .....	<b>9</b>
<b>2. Methods</b> .....	<b>10</b>
<b>2.1. Sample design</b> .....	<b>10</b>
<b>2.2. Questionnaire design</b> .....	<b>10</b>
<b>2.3. Data collection</b> .....	<b>11</b>
<b>3. Results</b> .....	<b>12</b>
<b>3.1. Australia’s internet profile</b> .....	<b>12</b>
<b>3.2. Digitally excluded</b> .....	<b>22</b>
<b>3.3. Internet user typologies</b> .....	<b>31</b>
<b>3.4. Barriers &amp; enablers to more use</b> .....	<b>37</b>
<b>3.5. Pathways</b> .....	<b>41</b>
<b>4. Discussion</b> .....	<b>44</b>
<b>References</b> .....	<b>46</b>
<b>Appendix 1: Statistical analyses</b> .....	<b>48</b>
<b>Appendix 2: Sample composition by barrier level</b> .....	<b>49</b>

## Table of Figures

Figure 1. Life satisfaction scores .....	14
Figure 2. Internet access at home & via mobile device(s) .....	15
Figure 3. Internet access locations (past 12 months) .....	15
Figure 4. Digital self-efficacy .....	16
Figure 5. Frequency of internet use over the past month .....	16
Figure 6. Mean attitude toward the internet – by frequency of use .....	17
Figure 7. Mean attitude toward the internet – by theme.....	17
Figure 8. Attitudes towards the internet (mean agreement score).....	18
Figure 9. Percentage of time using the internet compared to non-internet sources (aggregate).....	18
Figure 10. Percentage of time using the internet – WI and SME behaviours .....	19
Figure 11. Percentage of time using the internet – individual behaviours .....	19
Figure 12. Likelihood of using the internet in the next 12 months for individual behaviours.....	20
Figure 13. Suggestions to encourage more frequent internet use by online behaviour .....	21
Figure 14. Common excluded subgroups – access, skill & attitude .....	22
Figure 15. Target sample subgroups frequency of internet use .....	23
Figure 16. Mean personality trait scores by frequency of internet use .....	24
Figure 17. Significant differences in online behaviour – gender, age group, & location.....	25
Figure 18. Significant differences in online behaviour – employment, education, & income.....	26
Figure 19. Significant differences in online behaviour – CALD & indigenous status .....	27
Figure 20. Significant differences in online behaviour – disability status .....	27
Figure 21. Homeless: Sample composition .....	28
Figure 24. Homeless: Frequency of internet use over the past month.....	28
Figure 22. Homeless: Internet access locations (past 12 months).....	29
Figure 23. Homeless: Mean attitude toward the internet .....	30
Figure 25. Homeless: Online behaviour .....	30
Figure 26. Internet behaviour typologies.....	32
Figure 27. Percent of time online by typology group.....	32
Figure 28. Summary profile of typology groups (% of group) .....	34
Figure 29. Internet access by typology group .....	35
Figure 30. Digital self-efficacy & attitude by typology group.....	35
Figure 31. Reasons for infrequent internet use – ‘Non-users’ & ‘Samplers’ .....	37
Figure 32. Greatest concerns about the internet by typology group.....	38
Figure 33. Where internet skills first taught by typology group.....	39
Figure 34. Word Cloud – online activities .....	41
Figure 35. Online activity pathway.....	42

## Table of Tables

Table 1. Sample characteristics.....	12
Table 2. Top 3 suggestions to encourage future uptake by behaviour and typology group .....	40
Table 3. First online activities by typology group – frequency order .....	43

## Appendix Tables

Table A.1. Sample composition by access at home or via mobile device .....	49
Table A.2. Sample comparison by digital self-efficacy .....	50
Table A.3. Sample comparison by attitude score.....	51

## Executive summary

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Information and communication technologies (ICT) are an everyday tool for many living in developed countries however, not everyone is keeping up with the digital migration and some are at risk of being left behind ('digitally excluded'). Given the personal and societal benefits of utilising digital technologies, many researchers and policymakers are now trying to understand the barriers to, and drivers of, becoming digitally engaged (beyond simply having, or not having, access). Researchers have found that those who historically did not have access (e.g. the elderly, the poor, the unemployed, the homeless, etc.), may now have crossed the 'access barrier' but lack sufficient skills and motivation to utilise the full suite of benefits that the ICTs afford.

In this context, Australia Post, together with BehaviourWorks Australia and the Shannon Company, proposed to apply a behavioural lens to digital inclusion research by conducting a survey with the Australian community with an aim to:

- 1) Benchmark digital inclusion in Australia,
- 2) Identify, using behavioural profiling, audiences with low access to digital technologies who benefit most from digital inclusion, and
- 3) Develop engagement strategies.

The survey included a random sample of Australians, and some purposeful samples of minority groups who are at risk of being digitally excluded. Across the entire study, over 1,600 surveys were completed between April and June 2016.

At the total sample level, the majority of respondents, had internet access at home or via a mobile device (93%), used the internet daily or several times a day (84%), rated their ability to use the internet as 'good', 'very good', or 'excellent' (73%), and had a reasonably positive attitude towards the internet. While the majority were frequent internet users, it was also found that:

- 5% *did not have access and had not accessed* the internet in the previous 12 months,
- 12% rated their abilities as '*poor*',
- 6% had an average attitude rating of *2 or lower* (out of 5), and
- 9% reported *never using the internet*.

While these figures are relatively small, they support the suggestion that some Australians are at risk of being digitally excluded.

When asked about engaging with the internet in relation to specific behaviours, 'Searching for general information' was the most common online activity. In contrast, online shopping was the least common; however, it was also one of the few behaviours that respondents were somewhat likely to take up in the next 12 months. Specifically, respondents would shop online more if they had a need to do so (e.g. if a product/service was not available locally), if there were better options available online (e.g. cost, variety, speed), if security/privacy was improved, or the overall service was improved (e.g. faster or cheaper delivery).

As found in previous studies, access, skill, attitude, and frequency of use were related to demographic and socio-demographic characteristics. Age was the main contributing factor, where those aged 65 years or over were less likely to have internet access (69%), rated their skills as 'poor' or 'fair', had lower attitude scores, and never used the internet (26%). After controlling for the effects of other demographic characteristics; age, education, employment status, and disability status continued to make significant contributions to the observed variances. In other words, younger age, higher

education, being employment (as opposed to not being in the labour force or being unemployed), and not having a disability were associated with higher levels of self-efficacy, more positive attitudes, and more frequent internet use. Regardless of demographic characteristics however, the primary variables which affect frequency of use were access, skill, and attitude.

There was also significant variation in the way different groups preferred to engage with the online environment. For example, playing games online was more common among those who only attended primary/secondary schooling, the unemployed, those on a lower income, and the disabled. Whereas respondents from culturally and linguistically diverse backgrounds were more inclined to engage in behaviours which related to information and communication, which are often easier and cheaper to access or utilise via the internet in a non-English language or from another country.

Moving beyond demographic characteristics, cluster analysis identified five behaviour-based profiles of internet users:

- **'Non-users'** (9%) are those who never use the internet; they are typically older and lack interest, access, and the required skills. Many have never learned how to use the internet;
- **'Samplers'** (17%) rarely engage with the internet, are relatively older, and many simply lack interest. Unlike 'Non-users', most 'Samplers' have access, although they lack the self-efficacy and attitude to engage further;
- **'Socialisers'** (18%) prefer leisure-related online behaviours (particularly playing games and communicating with friends/family); their self-efficacy and attitude are moderate and many draw on family and friends for online training and encouragement;
- **'Pragmatics'** (25%) are among the heavier (and younger) internet users, however they largely prefer practical behaviours, such as banking, information searching, and job seeking. 'Pragmatics' have a more positive attitude and better skills than most groups; and
- **'Enthusiasts'** (31%) are the youngest group and the heaviest users. They have access, good skills and a positive attitude toward the internet. 'Enthusiasts' often learned how to use the internet on their own or at school.

When asked to participate in a short qualitative exercise to recall their first online activities, the majority of respondents, regardless of typology group, mentioned **communication** (e.g. email) and/or **information seeking** (e.g. Google). Overall, respondents who started with **communication** most often moved to **seeking information**, and vice versa. For those who started with these activities, the next most common step was a combination of **entertainment** and **socialising/networking**, followed by **managing finances** (e.g. banking) and **transactions** (e.g. eBay). This illustrates a broad pattern of progression from generalised and simple activities toward more complex and engaged ones. While different user-groups took slightly different steps along the path, the general pattern remained consistent with progression from easy to more advanced activities.

With a better understanding of the relationship between digital inclusion and behaviour, along with the associated barriers, the next step is to determine which online behaviours to target in order to reduce digital exclusion among vulnerable groups.

# 1. Introduction

---

*“An individual’s ability to use and access computers and the internet is vital to schooling and education generally, to participate effectively in the economy and, in many cases, to access everyday services” (Broadbent and Papadopoulos, 2013: 4).*

## 1.1. Background

Use of digital technologies yields many beneficial outcomes for individuals (access to education, employment, information and services), businesses (increased productivity and revenue), not for profit organisations (increased social connectivity and service delivery), and governments (reduced cost of services, faster response times, increased engagement) (Walton et al., 2013: 9.4-9.5). Given the benefits, access to information and communication technologies (ICT) is often considered a basic necessity for many Australians. Around one in five (21%) households rely on mobile internet connections, and a growing number of households are becoming exclusively mobile (no landline phone and no fixed internet connection at home) (ACMA, 2015). This increase in reliance has resulted in many services being offered (sometimes exclusively) in the digital environment. However, despite the proliferation of digital technologies, there are certain groups in society that are not utilising these opportunities – commonly referred to as being ‘digitally excluded’.

The concept of digital inclusion and exclusion has evolved in recent years. Previously, research focused on the ‘digital divide’, where individuals either had or did not have access to the internet and ICTs (Mubarak, 2015). ‘Digital inclusion’ extends the notion of the ‘digital divide’ away from a singular access-only view, acknowledging that “the simple binary description of a divide fails to do justice to the complex reality of various people’s differing access and usage of digital technology” (Warschauer, 2003: 44).

During a literature and practice review conducted as part of this research, three ‘levels’ of potential barriers were identified within the broader concept of digital inclusion, 1) access; 2) skill; and 3) attitude. Research has historically focused on ‘first level’ access issues (i.e. the ‘haves’ vs. the ‘have nots’), but in recent years there has been shift toward second and third level issues such as self-efficacy, motivation, and trust (Robinson et al., 2015). It has also been found that those who previously did not have the internet (the ‘have nots’) may have crossed the access barrier but are using the internet for passive behaviours such as entertainment, social media and gaming, rather than proactive behaviours such as everyday services or professional development services (Kalmus et al., 2011).

While the ‘divide’ is narrowing, digital inclusion in Australia continues to be mapped along demographic and socio-demographic dimensions. Research has demonstrated that many groups in Australia often lack the opportunity or motivation to use the internet; this includes those on low incomes, lacking tertiary education, living in regional or remote communities, of indigenous heritage, with disabilities, from culturally and linguistically diverse backgrounds, the unemployed, the homeless, and the elderly (ABS, 2014-15; Broadbent and Papadopoulos, 2013). This lack of opportunity in turn increases the social disadvantage already experienced by many individuals, limiting their exposure to everyday activities, friends and family, and important information (e.g. education (Skryabin et al., 2015), or health and wellbeing (Bell, 2014)).

Programs intended to redress digital inclusion have been conducted around the world, including developing countries such as Mexico (Casanueva-Reguart, 2015), Thailand (Tengtrakul and Peha, 2013), China (Rui, 2013), and Sri Lanka (Wijetunga, 2014); as well as developed countries such as Portugal (Aires, 2014), the UK (Ashmore et al., 2015; Mervyn et al., 2014; Nagler et al., 2013), France (Wu et al., 2015), and the USA (Araque et al., 2013; Ashmore et al., 2015; Hui and Png, 2015; Jones et al., 2015; Saenz-de-Urturi et al., 2015; Tsai et al., 2015; Warschauer et al., 2014; Fuentes-Bautista, 2014; Katz and Gonzalez, 2016; Lee, 2014; Ma and Huang, 2015; Nagler et al., 2013; Woodward et al., 2013). Typically these programs fall into one of four categories:

1. Providing access – to broadband, the internet, and different ICT technologies and software;
2. Increasing literacy – improving skills, knowledge and confidence to use digital technologies;
3. Increasing participation – in the governance and delivery of digital inclusions initiatives; and
4. Continued research – establishing benchmarks for digital inclusion, tracking change and deeper inquiry into the issue.

In Australia, research is currently being conducted to measure and track digital inclusion. This includes the “Australian Digital Inclusion Index”, conducted by Telstra, the Swinburne Institute for Social Research, and the Centre for Social Impact<sup>1</sup>; as well as the “Cultivating Digital Capacities” project which is being conducted by the Institute for Culture and Society at Western Sydney University and the Young and Well Cooperative Research Centre, in partnership with Google Australia<sup>2</sup>. Community level programs have also been developed to ensure disadvantaged groups have the ability to participate in the digital world, offering free or cheap internet access, free or cheap computers to residents, local intranet sites, computing rooms, or digital literacy training. For example, the ‘Wired Community’ initiatives, led by Infoxchange, have resulted in increased computer ownership, access to and use of online social services, employment opportunities (used as aid to search and apply for employment), education opportunities, expanded source of information, news and communication, and increased social connectedness (Isoquant Consulting, 2010; Isoquant Consulting, 2012).

Insights emerging from the digital inclusion literature, such as the differences in how and why people use the internet (Kalmus et al., 2011) and the need to look beyond digital inclusion as a function of socio-demographic variables alone (van Deursen and van Dijk, 2015), present opportunities for further research, particularly in an Australian context. There is an opportunity to develop a behaviour-focused typology of internet users, which goes beyond demographic characteristics alone, including attitudes and patterns of internet use. Knowing the behavioural pathways which internet users follow would be useful to understand where progression starts and stops. On the basis of this knowledge, programs could then be designed to shift individuals from passive activities to more active ones that lead to personal and professional gains.

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<sup>1</sup> <http://digitalinclusionindex.org.au/>

<sup>2</sup> [http://www.uws.edu.au/ics/research/projects/digital\\_capacity\\_index](http://www.uws.edu.au/ics/research/projects/digital_capacity_index)



## 1.2. Aim

Given the ever-changing nature of digital inclusion and the associated personal and societal benefits of being included, Australia Post is committed to playing a role in improving digital inclusion in Australia. Together with BehaviourWorks Australia and the Shannon Company, they conducted a survey to 1) benchmark digital inclusion in Australia, 2) identify (using behavioural profiling) audiences with low access to digital technologies who benefit most from digital inclusion, and 3) develop engagement strategies to improve digital inclusion among vulnerable groups.

## 1.3. Ethics

This study was approved by the Monash University Human Research Ethics Committee (MUHREC) - project number: CF16/786 – 2016000381.

## 1.4. Reading this report

The purpose of this report is to synthesise evidence collected from the Digital Inclusion survey to address the following research questions:

1. What does Australia's internet profile look like?
2. Which Australian's are digitally excluded?
3. What are the behaviour based typologies of internet users?
4. What are the barriers & enablers to use/more use?
5. What are the pathways different groups take from non- to moderate- to high-users? and
6. How can the uptake of online behaviours be increased among digitally excluded groups?

After Section 1: Introduction, Section 2 presents a summary of the Methods involved in designing and collecting data for an Australian based survey of internet use. Section 3 then presents the survey Results. Each Results sub-section addresses one of the research questions outlined above:

- [3.1. Australia's internet profile](#) – including sample characteristics, level of access, digital self-efficacy, frequency of use, attitude towards the internet, specific online behaviours, and possible future uptake.
- [3.2. Digitally excluded](#) – summarises key demographic and socio-demographic characteristics of digitally excluded respondents across access, skill, and attitude; internet use and behavioural differences among targeted subgroups (including homeless persons).
- [3.3. Internet user typologies](#) – analysis of behaviour based internet user typologies, summary of access, skill, attitude, & behaviour of different typology groups.
- [3.4. Barriers and enablers to more use](#) – summarises reasons for infrequent internet use and concerns about the internet between typology groups, sources of internet education and encouragement suggestions by typology groups.
- [3.5. Pathways](#) – summarises recall of first online activities (at the total sample level and by typology group).

The final question is addressed in Section 5: Discussion, which draws on all the information presented previously to provide guidance for next steps for improving digital inclusion in Australia.

## 2. Methods

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This section summarises the methods involved in designing an Australian based survey of internet use including sample and questionnaire design, and data collection.

### 2.1. Sample design

The population for the study included all Australians aged 18 years or over. The sample frame was randomly generated telephone numbers with a 50:50 split between the landline and mobile phone numbers. For the landline sampling frame, when there were two or more in-scope persons in a household the youngest household member was invited to participate. For the mobile frame, the person who answered the phone was the selected respondent, provided they were in-scope.

To ensure a reasonably representative sample was obtained quotas were implemented by gender (male and female), age group (18-34 years, 35-54 years, 55-64 years, and 65 years or over), and geography (greater capital city and rest of state). In addition to the general community sample, a purposeful 'top-up' sample was required to ensure adequate representation from key subgroups. The subgroups were identified from the literature and practice review as individuals in the Australian community who were likely to be digitally excluded; these groups included:

- Low income earners (earning less than \$400 per week),
- Older adults (aged 65+ years),
- Those with a lower education level (no post-school qualifications),
- Sole-parent families (single parent with dependent children),
- The disabled (identifies as having a disability),
- The unemployed (unemployed & either seeking or not seeking employment),
- Culturally and linguistically diverse communities (speaks a non-English language at home, born overseas, & speaks English as a second language),
- Remote communities (lives in a 'remote' or 'very remote' area),
- Indigenous persons (identifies as aboriginal and/or Torres strait islander), and
- Homeless persons (no permanent household).

After reviewing preliminary data from the telephone survey, only two community groups required purposeful sampling – persons living in remote communities and homeless persons. Remote communities were targeted using geo-coded landline telephone information. Homeless persons were targeted through liaison with homeless support groups via a separate data collection process, this is discussed in detail below.

### 2.2. Questionnaire design

The questionnaire was designed in collaboration with Australia Post and was informed by findings from the literature and practice review. The questionnaire covered five broad topics:

1. Demographic and socio-demographic characteristics – including age, gender, and location for quota sampling, as well as household composition, income, employment status, education qualifications, disability status, and cultural background and identification;
2. 'Offline' characteristics – life satisfaction, Big Five Personality Inventory, and attitude toward Australia Post;
3. Access to the internet and ICTs – home internet connection, internet access locations and frequency, and access to mobile internet devices;

4. Skills and attitude – primary source of internet education, digital self-efficacy, and Internet Attitude Scale; and
5. Online behaviour – preference for online vs. offline for specific behaviours, likelihood of future uptake, suggestions to encourage future uptake, and pathways to engagement.

The questionnaire estimated to take approximately 20 minutes to complete via a telephone interview. To assess interview length and questionnaire comprehension a pilot study was conducted prior to main data collection.

### **Piloting**

A pilot study was administered between April 5 and April 7, 2016. The purpose of the pilot was to test the questionnaire for comprehension, flow, and length. This included testing the introductory script, understanding of key concepts, identifying common response options to open-ended questions, checking sequencing logic, and checking general question comprehension.

The pilot survey was conducted with 50 respondents and took an average of 18 minutes to complete. After reviewing survey data and feedback from the interviewing team several changes were made to the questionnaire including the development of code frames for open-ended questions (based on common responses), addition of qualifiers and instructions for improved comprehension, and removal or rephrasing of questions which were identified as problematic.

## **2.3. Data collection**

### **General community survey**

The survey was administered using computer assisted telephone interviewing (CATI). A random sample of telephone numbers was generated<sup>3</sup> to ensure the survey was reasonably representative of the Australian population. Fieldwork was conducted between April 18 and May 1, 2016 with **1,500** Australian community members. The interview duration was approximately 18 minutes.

### **Top-up survey**

As mentioned previously, where targeted subgroups did not have adequate representation in the general community survey (i.e.  $n \leq 30$ ) purposeful 'top-up' sampling was conducted.

For members of remote communities a targeted sampling approach was adopted using geo-coded telephone numbers identified as 'remote' and 'very remote' according to the Australian Bureau of Statistics 'Accessibility/Remoteness Index of Australia' (ARIA). An additional 84 interviews were conducted between May 2 and 21, 2016. As some areas in Australia have overlapping remoteness area classifications, 34 surveys were conducted with respondents from predominantly regional areas and 50 were with respondents from exclusively remote areas. The final sample size was **1,584**.

Given that the homeless community in Australia represent less than 0.5% of the population, and many do not have access to a landline telephone, an alternative data collection method was required. A shortened two page version of the questionnaire was made available to homeless persons through The Big Issue<sup>4</sup>. Participants were provided with an Explanatory Statement prior to participation. The shortened surveys were completed between June 6 and 10, 2016 with 27 members of the homeless community.

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<sup>3</sup> This was undertaken by the sample vendor SamplePages who use algorithms to provide a quality 'random digit dialling' (RDD) sample for landline and mobile sampling frames.

<sup>4</sup> <http://www.thebigissue.org.au/>

## 3. Results

Section 3 presents a detailed overview of the results collected from the study. Findings are presented in line with the primary research questions: 1. profiling internet use in Australia; 2. profiling the digitally excluded; 3. analysing typologies of internet users; 4. assessing barriers & enablers to use; and 5. summarising pathways taken by different user groups. The final research question is addressed in the Discussion section of this report.

### 3.1. Australia's internet profile

The following section provides a summary of survey results at the total sample level including an overview of respondent demographic socio-demographic characteristics and respondents' 'offline' characteristics such as personality characteristics and life satisfaction. This section also presents a snapshot of respondents' access to the internet, self-rated ability, frequency of use, online behaviours, and future uptake. The purpose of this section is to address the research question: What does Australia's internet profile look like?

#### Sample characteristics

Table 1 presents a summary of the demographic characteristics of the respondent sample. In general, the sample was reasonably representative of the Australian population where the majority resided in major cities (67%), were employed (64%), and had completed high school (77%). The sample also included a small percentage of respondents who were unemployed (6%), identified as indigenous (3%), and who did not live in a permanent household (<1%).

**Table 1. Sample characteristics**

Demographic characteristics		Population*	Total sample (n=1,584)	
		%	n	%
<b>Gender</b>	Female	51%	832	53%
	Male	49%	752	47%
<b>Age group</b>	18-24 years	12%	162	10%
	25-34 years	18%	215	14%
	35-44 years	19%	238	15%
	45-54 years	18%	303	19%
	55-64 years	15%	292	18%
	65 years or over	18%	374	24%
<b>Geography</b>	Major Cities	70%	1060	67%
	Inner Regional	18%	300	19%
	Outer Regional	9%	154	10%
	Remote	1%	52	3%
	Very Remote	1%	18	1%
<b>State</b>	New South Wales	32%	470	30%
	Victoria	25%	368	23%
	Queensland	20%	348	22%
	South Australia	8%	128	8%
	Western Australia	10%	184	12%
	Tasmania	2%	36	2%
	Northern Territory	1%	24	2%
	Australian Capital Territory	2%	26	2%

Demographic characteristics		Population*	Total sample (n=1,584)	
		%	n	%
<b>Household type</b>	Single person household		299	19%
	Couple without children		306	19%
	Couple with dependent children		419	26%
	Couple with non-dependent children only		275	17%
	Single parent with dependent children	N/A	69	4%
	Single parent with non-dependent children only		40	3%
	Group household (e.g. unrelated housemates)		110	7%
	No permanent household		4	<1%
	Other type of household		62	4%
<b>Personal income</b>	Negative personal income	1%	10	1%
	Nil personal income	6%	67	5%
	\$1-\$199 (\$1-\$10,399)	7%	48	4%
	\$200-\$299 (\$10,400-\$15,599)	12%	82	6%
	\$300-\$399 (\$15,600-\$20,799)	11%	106	8%
	\$400-\$599 (\$20,800-\$31,199)	13%	189	15%
	\$600-\$799 (\$31,200-\$41,599)	12%	151	12%
	\$800-\$999 (\$41,600-\$51,999)	9%	142	11%
	\$1,000-\$1,249 (\$52,000-\$64,999)	9%	133	10%
	\$1,250-\$1,499 (\$65,000-\$77,999)	6%	96	7%
	\$1,500-\$1,999 (\$78,000-\$103,999)	7%	109	8%
	\$2,000 or more (\$104,000 or more)	7%	158	12%
<b>Employment status</b>	Self-employed or a small business owner		158	10%
	Employed full time	61%** (employed)	558	35%
	Employed part time / casually		294	19%
	Student only	35%**	34	2%
	Engaged in home duties or volunteer work	(not in the labour force)	35	2%
	Retired		403	25%
	Unemployed but currently seeking employment	4%**	48	3%
	Unemployed and not seeking employment	(unemployed)	54	3%
<b>Educational qualification</b>	Year 10 or below	27%	304	19%
	Year 11	6%	66	4%
	Year 12	18%	293	18%
	Certificate	19%	203	13%
	Diploma/Advanced Diploma	9%	188	12%
	Bachelor's degree	15%	312	20%
	Graduate diploma/Graduate certificate	2%	47	3%
	Postgraduate degree	4%	171	11%
<b>Cultural &amp; linguistic diversity</b>	Born overseas	35%	396	25%
	Non-English speaker at home	24%	220	14%
	English is NOT first language	N/A	173	11%
<b>Indigenous</b>	Identifies as indigenous	2%	47	3%
<b>Disability</b>	Identifies as having a disability	18%^	151	10%

\*Data sourced from 2011 ABS Census <http://www.abs.gov.au/websitedbs/censushome.nsf/home/tablebuilder>

\*\*Aggregate data available only

^Data sourced from 2012 ABS Survey of Disability, Ageing and Carers

<http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/A813E50F4C45A338CA257C21000E4F36?opendocument>

In addition to demographic and socio-demographic questions, personality traits and life satisfaction were also measured to better understand respondent's 'offline' characteristics.

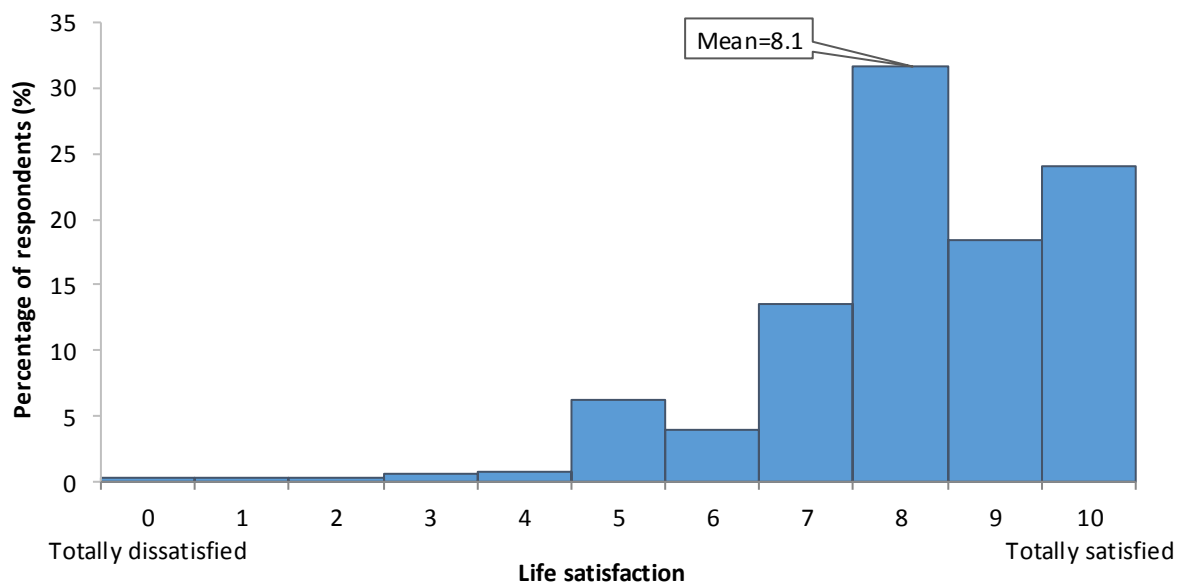
Personality was assessed using a ten item measure of the 'Big Five Personality Inventory': Extraversion (i.e. sociable, assertive, active; not reserved, or shy), Agreeableness (i.e. trusting, sympathetic, cooperative; not aggressive, or cold), Conscientiousness (i.e., hardworking, self-disciplined; not careless, or impulsive); Emotional stability (i.e. relaxed, self-confident; not anxious, or easily upset); and Openness to experience (i.e. reflective, open-minded; not conventional) (Gosling et al., 2003). Each trait was measured by two items which respondents rated on a five point scale from 'strongly disagree' (1) to 'strongly agree' (5). The average of the two items make up the scale for each personality trait.

As each trait was measured using only two items, internal consistency (i.e. how well the items measure the relevant trait) was assessed using Pearson's correlation coefficients<sup>5</sup> ( $r$ ) to determine the relationship between item pairs. The results are displayed below and are considered generally small ( $r=.10$  to  $.29$ ) to medium ( $r=.30$  to  $.49$ ) relationships (Cohen, 1988);

- Extraversion  $r=.35$ ,
- Agreeableness  $r=.12$ ,
- Conscientiousness  $r=.23$ ,
- Openness to experience  $r=.30$ , and
- Emotional stability  $r=.12$ .

Life satisfaction was measured by asking respondents to rate how satisfied they were with their life, from (0) "totally dissatisfied" to (10) "totally satisfied". Overall, respondents were generally satisfied, providing a mean satisfaction rating of 8.1. This finding is similar to that obtained in an ongoing Australian survey, the Household, Income and Labour Dynamics in Australia (HILDA) survey, where life satisfaction varies between 7.5 and 8.5, depending on geographic location (Ambrey and Fleming, 2014).

Figure 1. Life satisfaction scores

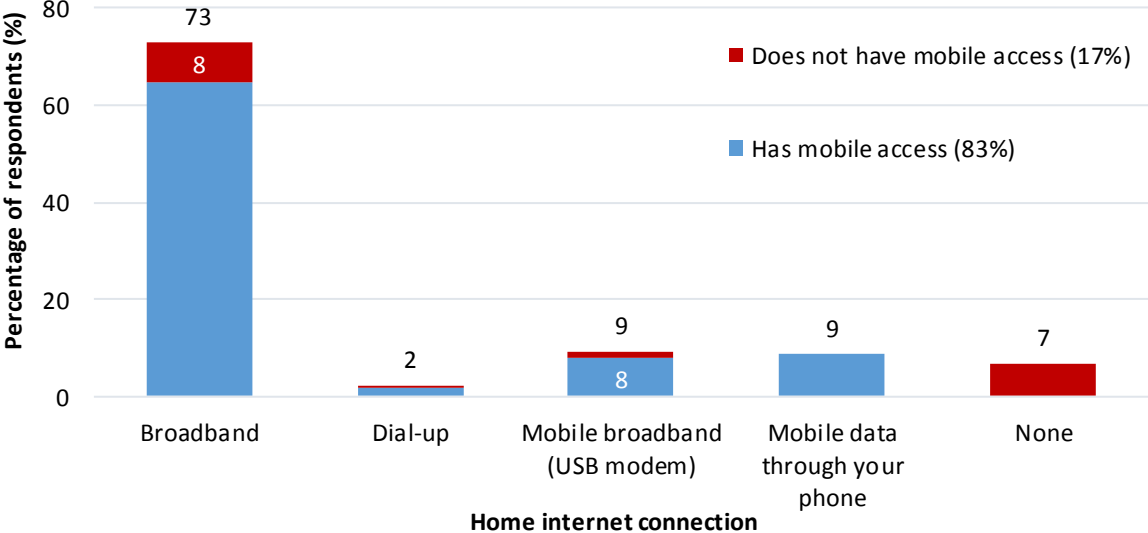


<sup>5</sup> See Appendix 1: Statistical analyses for more information on correlations

### Access

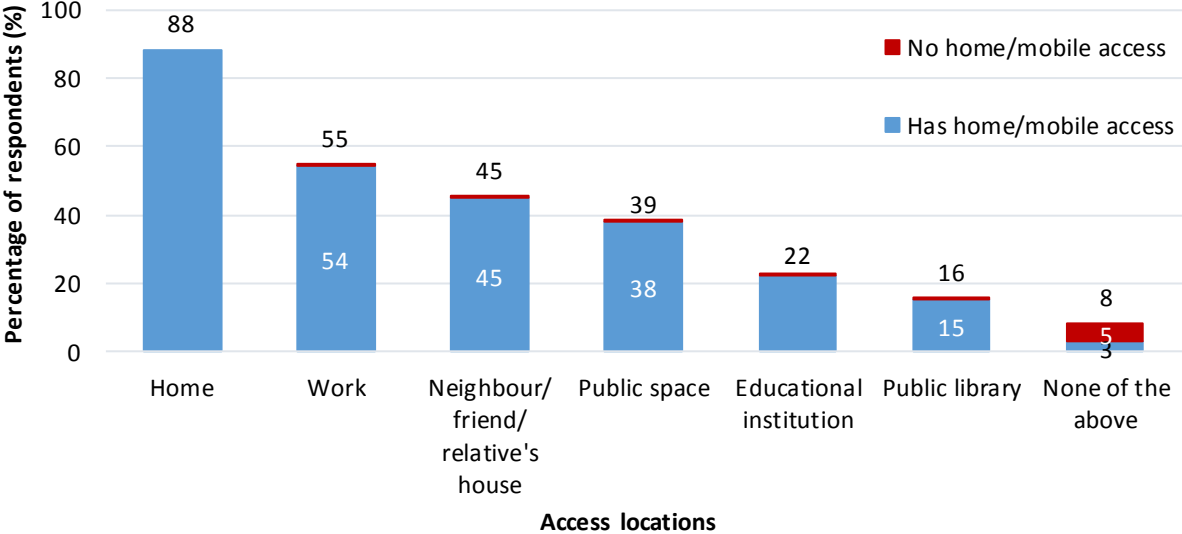
Respondents were asked several questions to determine their ability to access the internet. Similar to the general population (ABS, 2014-15), the majority of respondents had some form of internet access at home, most commonly broadband (73%), and around four in five (83%) had a mobile device (phone, tablet, etc.) which could be used to access the internet. However, this leaves 7% with no way to access the internet at home.

Figure 2. Internet access at home & via mobile device(s)



In addition to having internet access at home, respondents were asked if they had accessed the internet from various locations in the previous 12 months. Just under one in ten (8%) had not accessed the internet at all in the previous 12 months and 5% had not accessed the internet nor did they have access at home or via a mobile device. The majority had accessed the internet in some form – most commonly from home (88%), work (55%), at a friend or relative’s house (45%), or from a public space (39%).

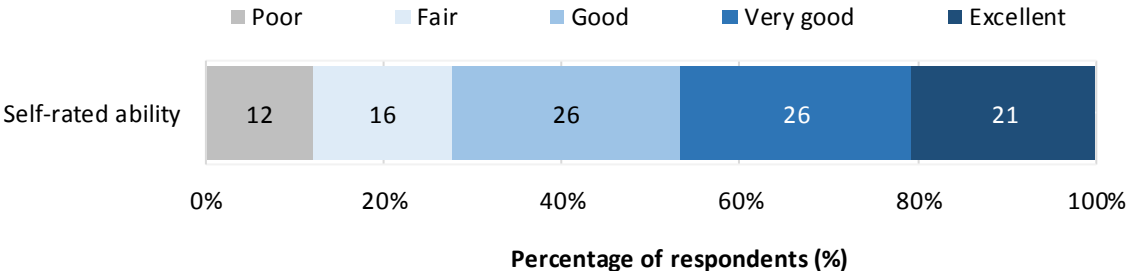
Figure 3. Internet access locations (past 12 months)



### Skill & use

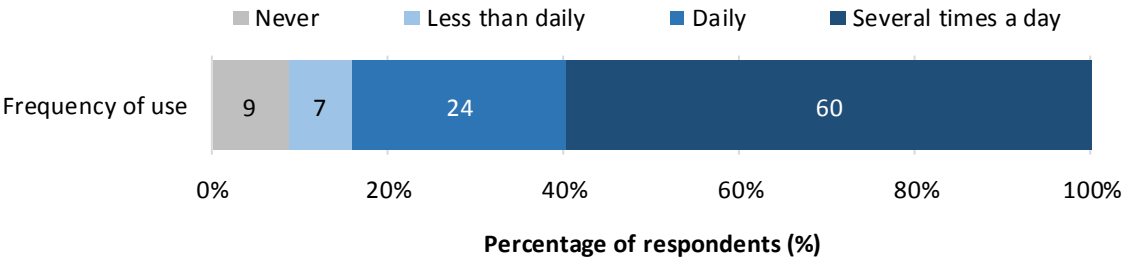
The survey included a question to measure digital self-efficacy (Helsper and Eynon, 2013) which asked respondents to rate their ability to use the internet on a 5 point scale from (1) 'poor' to (5) 'excellent'. Around one in four respondents (28%) felt that their internet ability was 'poor' or 'fair'. The majority of those *without* internet access rated their abilities as 'poor' or 'fair' (86%), however, among those *with access* around one in four (23%) also believed their abilities were 'poor' or 'fair'. This illustrates that while the majority of Australians may have access to the internet, there are still some who may not have the required skills to engage – this is discussed further in Section 3.2.

Figure 4. Digital self-efficacy



To measure internet use, respondents were asked how often they had used the internet during the previous four weeks from 'never' to 'several times a day'. The most common response was 'several times a day' (60%), followed by 'daily' (24%). Just under one in ten (9%) never used the internet, and only 7% provided a response that was less than daily but not 'never' (e.g. 'at least weekly', 'once a month', or 'less than once a month'). As with digital-self efficacy, those who never used the internet were primarily those without internet access, however 3% of respondents had access but still did not use the internet. There was also a positive relationship between digital self-efficacy and frequency of use where higher ability ratings were associated with more frequent use.

Figure 5. Frequency of internet use over the past month

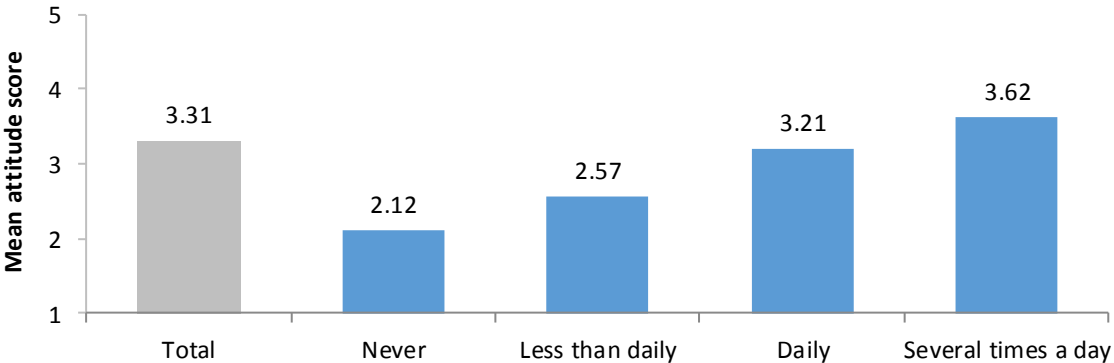




## Attitude

Attitude was measured using a modified version of Morse et al.'s (2011) Internet Attitude Scale. Respondents were asked to rate their level of agreement with 14 statements from (1) 'strongly disagree' to (5) 'strongly agree'. Attitude scores represent the mean of the 14 statements, where negatively worded questions (e.g. "I feel uncomfortable using my credit card online") were reverse coded. Figure 6 summarises the mean attitude scores by frequency of use. Generally, respondents had neutral or positive attitudes with 74% having a mean attitude score of 3.00 or higher. As found with digital self-efficacy, there was a positive relationship between frequency of use and attitude, where more positive attitude scores were associated with more frequent use.

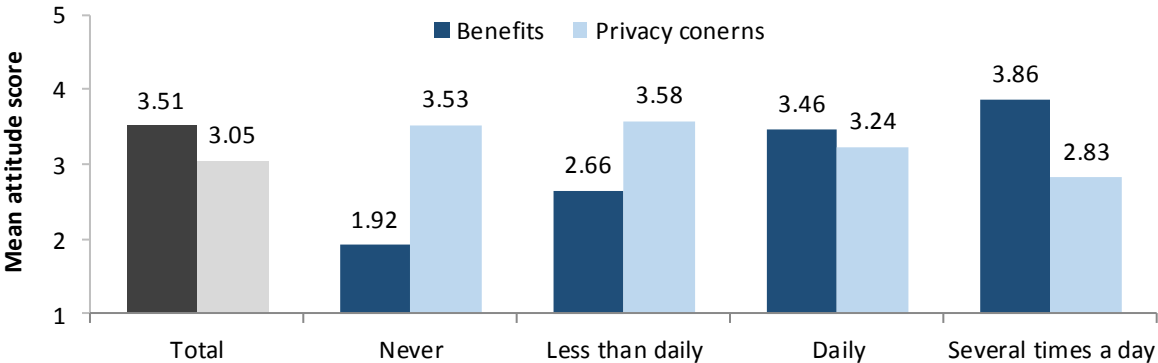
Figure 6. Mean attitude toward the internet – by frequency of use



The 14 item attitude scale had good internal consistency (i.e. the items reliably measured overall internet attitude) ( $\alpha=0.84$ ) and was comparable to Morse et al.'s (2011) original 17 item scale ( $\alpha=0.72$ ). Factor analysis<sup>6</sup> was used to identify possible underlying attitude factors. From this, two 'themes' were identified – 'Benefits of using the internet' ( $\alpha=.85$ ), and 'Privacy concerns' ( $\alpha=.71$ ) (see Figure 8 for factor groupings). While Morse et al. identified a three factor solution, the 'Benefits of using the internet' factor included many of the items associated with their 'General Internet usage' and 'Task facilitation' factors. Similarly, items from the 'Privacy concerns' factor aligned with their 'Negative Internet attitudes' factor. Given that all the items associated with 'Privacy concerns' were negatively worded, reverse coding was not conducted – i.e. higher scores indicate negative attitudes towards internet privacy.

Overall, respondents had a mean 'Benefits' score of 3.51 and a mean 'Privacy concerns' rating of 3.05 (out of 5). Those who never use the internet had the lowest rating for 'Benefits' (mean=1.92) and one of the highest ratings for 'Privacy concerns' (mean=3.53). Infrequent users (mean=3.58) were also more concerned about privacy compared to frequent users.

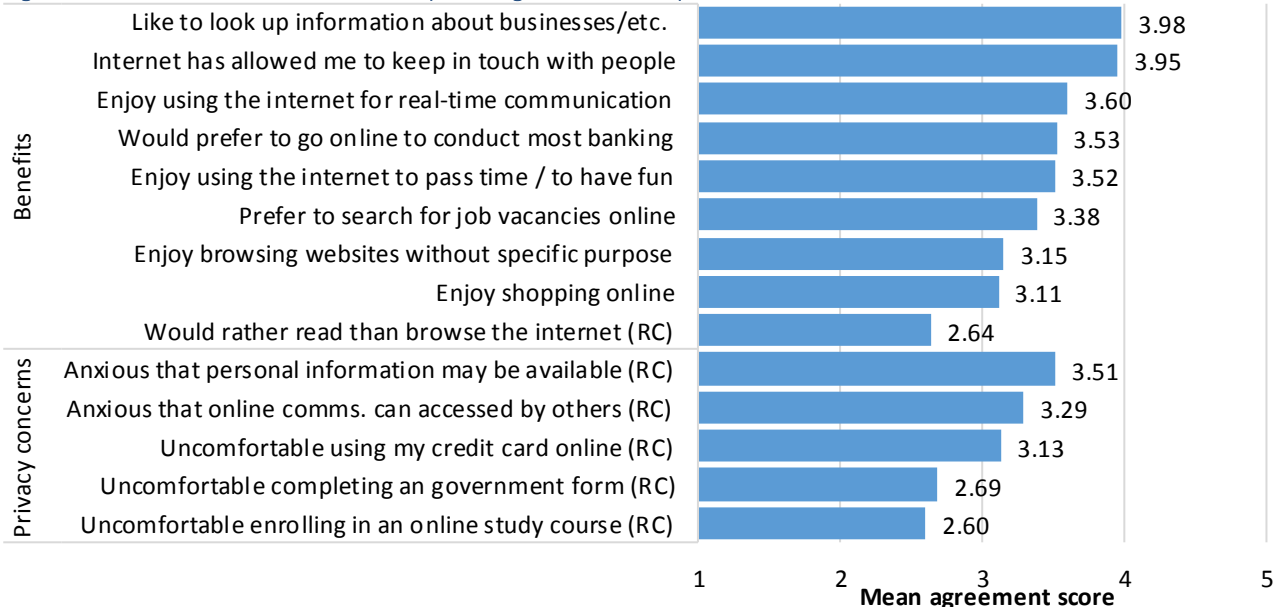
Figure 7. Mean attitude toward the internet – by theme



<sup>6</sup> See Appendix 1: Statistical analyses for more information on factor analysis

At the individual item level, respondents typically agreed with the statements ‘I like to look up information about businesses, services, and/or products on the internet’ (mean=3.98) and ‘I feel that the internet has allowed me to keep in touch with many people’ (mean=3.95). In contrast, respondents were least likely to agree with the statements ‘I would feel uncomfortable enrolling in an online study course’ (mean=2.60) and ‘When searching for information, I would rather read books, magazines, and newspapers than browse the internet’ (mean=2.64).

**Figure 8. Attitudes towards the internet (mean agreement score)**

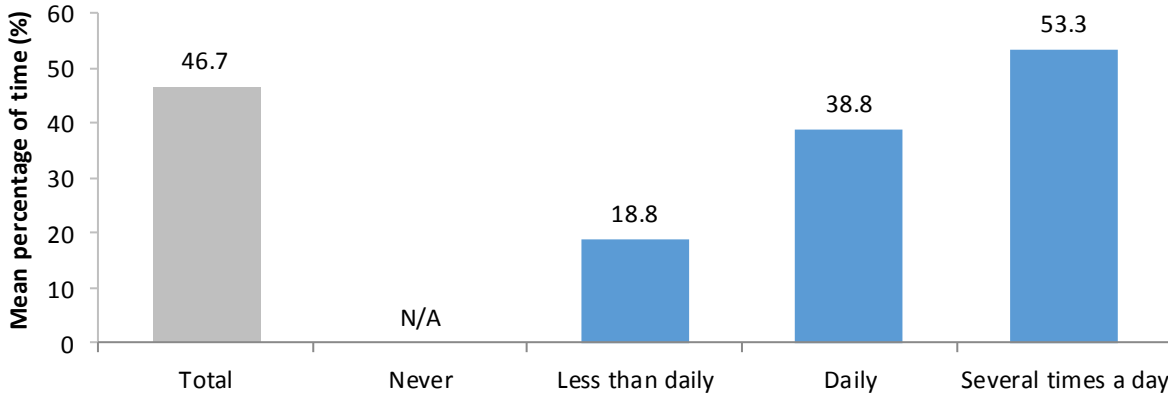


(RC) indicates items that were reverse coded for generating overall & benefit attitude scores

**Behaviour**

Internet users were asked a series of questions to better understand their online preferences. Respondents were asked to consider if they needed to perform certain activities what percentage of the time (between 0 and 100) they would use the internet compared to non-internet sources. The list of behaviours was adapted from two studies (van Deursen and van Dijk (2014) and Kalmus et al. (2011)). The list was reduced to 12 items with wording modifications to reflect general behaviours, rather than online ones. Figure 9 summarises the mean ‘percent of time’ across all behaviours. Typically, respondents used the internet just under half of the time (mean=46.7%). As anticipated, incidence was lowest for ‘less than daily’ users (mean=18.8%) and highest for ‘several times a day’ users (mean=53.3%). This question was not asked of those who reported never using the internet.

**Figure 9. Percentage of time using the internet compared to non-internet sources (aggregate)**

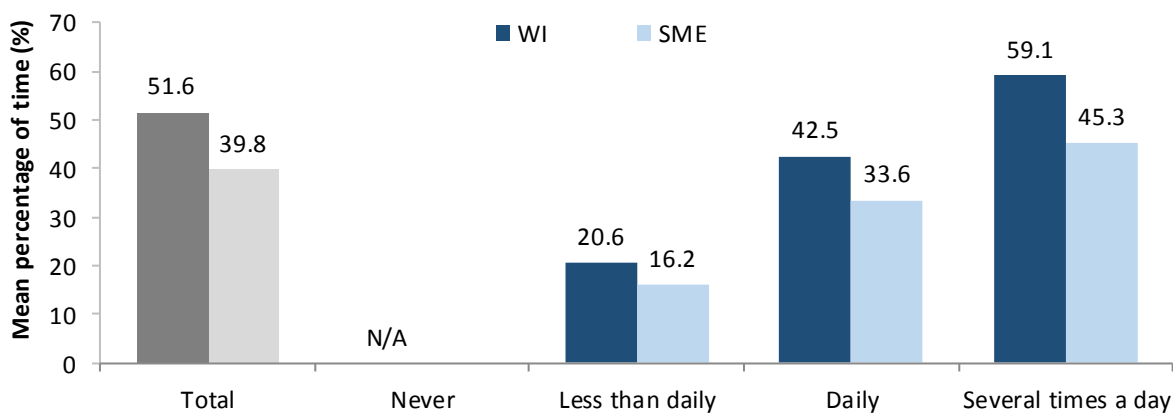


Base: Internet users; n=1448

From the 12 item behaviour scale, factor analysis<sup>6</sup> confirmed the two behaviour ‘themes’ (i.e. specific behaviours which were associated with other behaviours) identified by Kalmus et al. (2011). Factor 1 ( $\alpha=.86$ ) included the items ‘searching for general information’, ‘seeking news’, ‘banking or paying bills’, ‘shopping’, ‘using government services’, ‘searching for job vacancies/applying for jobs’, and ‘searching for courses and training opportunities’. This factor aligned with Kalmus et al.’s ‘Work- and information-related Internet use’ or ‘WI’. Factor 2 ( $\alpha=.72$ ) included ‘expressing your opinion on topics you consider important’, ‘seeking entertainment’, ‘playing games’, ‘communicating with friends/family’, and ‘sharing photos/videos’; and aligned with Kalmus et al.’s ‘Social media- and entertainment-related Internet use’ or ‘SME’.

As seen in Figure 10, respondents tended to prefer WI behaviours (mean=51.6% of the time) compared to SME ones (mean=39.8% of the time). In both cases, behaviours were significantly<sup>7</sup> more common among ‘several times a day’ users compared to ‘daily’ and ‘less than daily’ users.

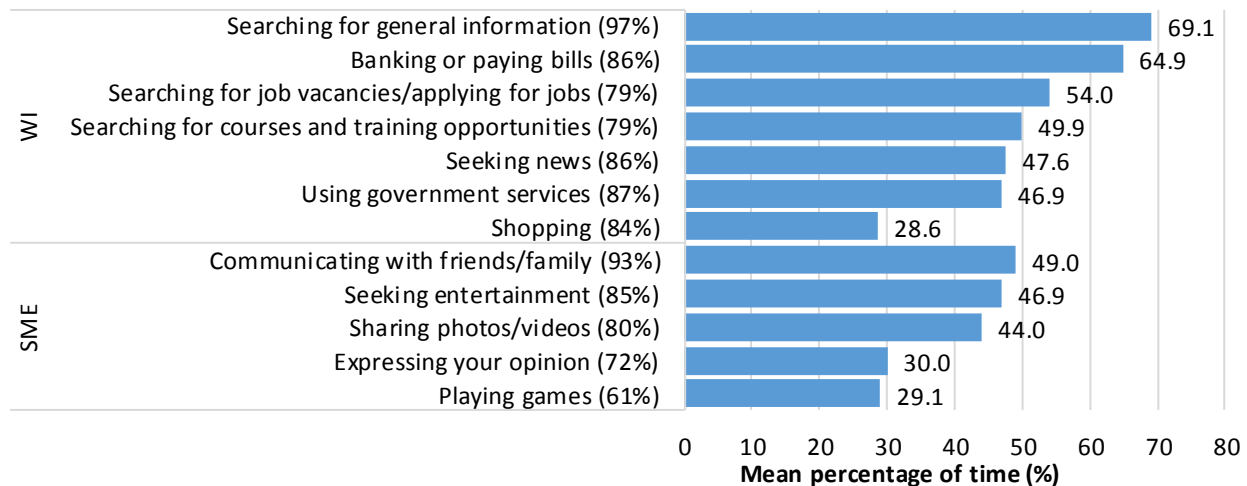
**Figure 10. Percentage of time using the internet – WI and SME behaviours**



Base: Internet users; n=1448

Figure 11 presents the mean percentage of time for each behaviour – the proportion of internet users who provided a value greater than 0 are provided in brackets (n%). The most popular online behaviour was ‘searching for general information’ (97% of users, mean=69.1% of the time). The least popular behaviour was ‘playing games’ (61% of users, mean=29.1% of the time). While 93% of users will use the internet to communicate with family and friends, they only communicate online about half the time (49% of the time). Similarly, 84% of users shop online but only 28.6% of the time on average.

**Figure 11. Percentage of time using the internet – individual behaviours**



Base: Internet users; n=1448

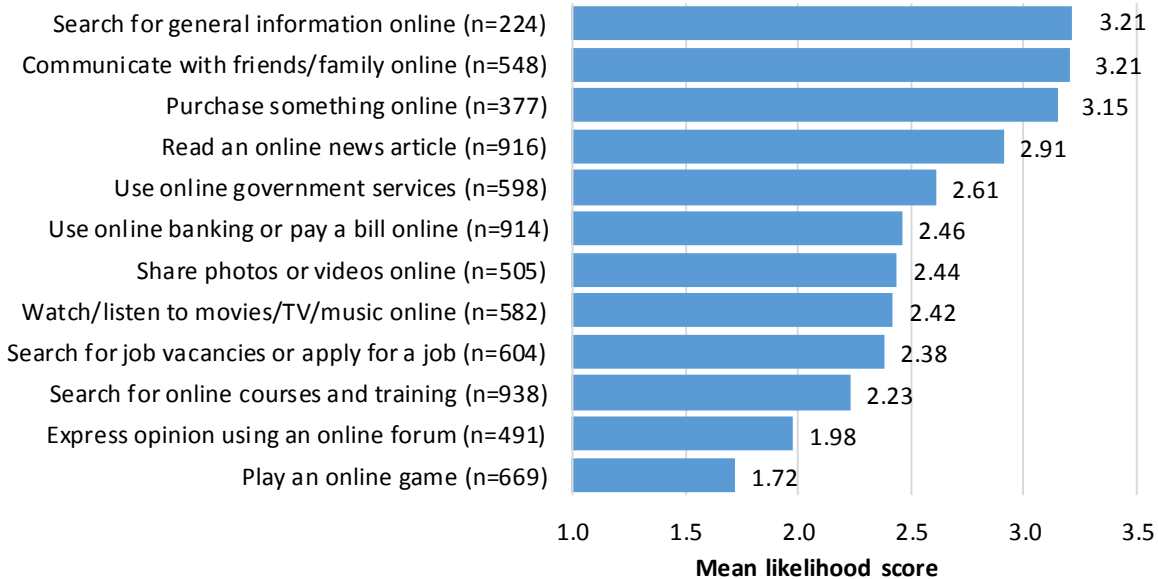
<sup>7</sup> See Appendix 1: Statistical analyses for more information on factor analysis and significance testing

### Future uptake

Those who indicated that they used the internet less than 30% of the time for a particular activity were asked how likely they would be to use the internet for each relevant activity in the next 12 months. Responses were collected on a 5-point scale from (1) 'very unlikely' to (5) 'very likely'. Mean likelihood scores are provided in Figure 12.

Only three of the 12 behaviours had a mean likelihood rating greater than 3.00 – 'search for general information online' (mean=3.21), 'communicate with friends/family online' (mean=3.21), and 'purchase something online' (mean=3.15). Those behaviours that were *least* likely to be taken up in the next 12 months were 'express your opinion in an online forum' (mean=1.98), and 'play an online game' (mean=1.72).

**Figure 12. Likelihood of using the internet in the next 12 months for individual behaviours**



*Base: Engaged in relevant behaviour less than 30% of the time*

Each likelihood question was linked to a follow-up question which asked respondents to provide suggestions for how they could be encouraged to take up the relevant online behaviour more often. Open text responses were reviewed to identify common thematic categories which are presented in Figure 13 (on the following page).

Many respondents indicated that nothing would encourage them to use the internet more often for the relevant behaviour. Typically this was because they either had no interest, felt the activity did not apply to them, were satisfied that they were already using the internet enough, or felt they did not know what might encourage them.

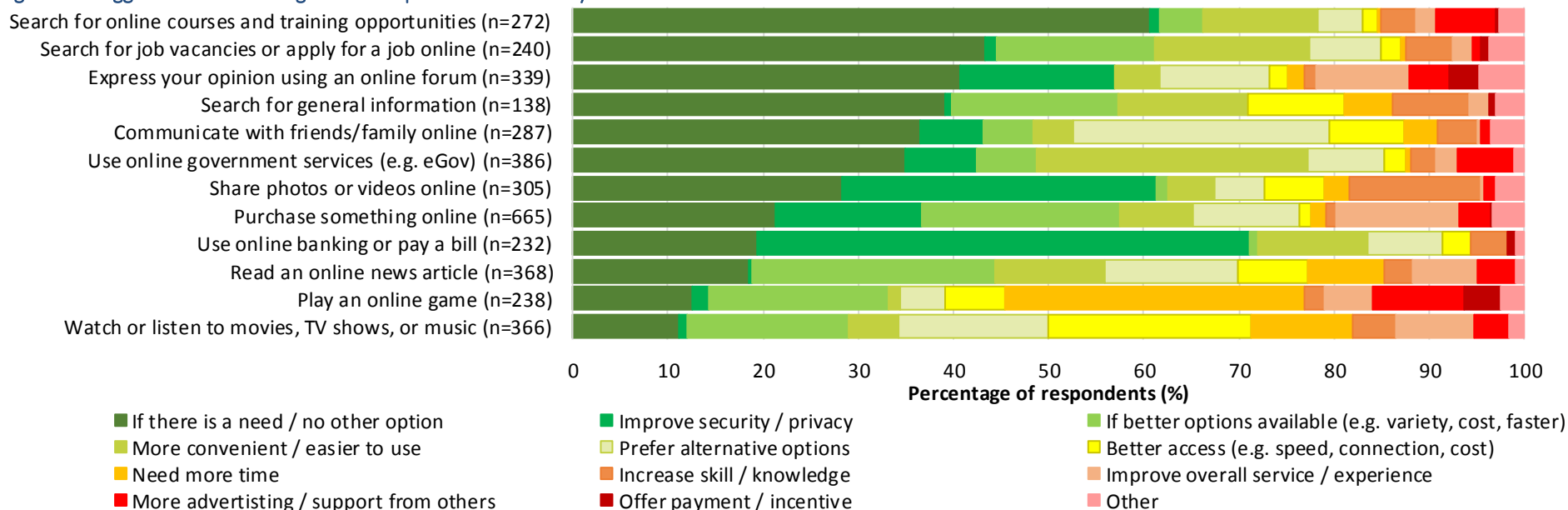
Taking into account only those who could provide a suggestion, the most common response across all behaviours was that if there was a specific *need* to use the internet the respondent would use it more often – this might be due to distance restrictions (e.g. purchasing items that are not available locally), if the alternative offline options were restricted or no longer available (e.g. government services no longer offered phone or in-person services), or if the individual needed to do the relevant behaviour more often (e.g. required additional training for their job). Other common responses included improving security and privacy, ensuring the online service provided better options such as variety, convenience, or service speed, and making the online interface more convenient or easier to use.

Below is a summary of the comment categories (where a suggestion could be provided) to encourage internet use for each behaviour. ‘Better access’ (e.g. speed, connection, or cost) was mentioned by some respondents, most commonly in relation to watching or listening to movies, TV, or music (21%). ‘Increase skill / knowledge’ was also mentioned on occasion, most often for technical behaviours such as sharing photos/videos (14%) and searching for information (8%).

For behaviours which are highly dependent a specific necessity (e.g. searching for courses or job vacancies) the most common response was ‘if there is a need / no other option’ (61% and 43% respectively). For online banking (52%) and sharing photos or videos (33%), ‘improve privacy / security’ was also a common suggestion. Respondents sometimes indicated that they would use the internet more ‘if better options were available’ online (e.g. variety, cost, service speed) – this was most prominent for reading online news articles (26%) and online purchases (21%). Just over one in four of those who do not use online government services suggested that making the interface ‘more convenient / easier to use’ would encourage them to use it more (28%).

When reviewed by behaviour type (‘WI’ and ‘SME’), it is worth noting that WI behaviours elicit more suggestions relating to improving service quality (e.g. “quick delivery”, “if there was free delivery/if there was ease picking up products”), whereas SME behaviours had a higher incidence of ‘not interested/not applicable’ responses, and were more likely to require access improvement such as speed, connection, and cost (e.g. “data is too expensive for me to consider this”).

**Figure 13. Suggestions to encourage more frequent internet use by online behaviour**



Base: Infrequent use of the internet for relevant behaviour (= < 30% of the time) and could provide a valid response

## Summary of Australia’s internet profile

Taking into account results presented so far, it is evident that the majority of respondents:

- Had internet access at home,
- Had a mobile device which could be used to access the internet,
- Used the internet daily or several times a day,
- Rated their ability to use the internet as ‘good’, ‘very good’, or ‘excellent’, and
- Had an average attitude rating of 3 or higher (out of 5).

Internet users turn to the internet about half of the time when they need to perform certain activities – most commonly for WI behaviours such as searching for information, or banking/paying bills.

There were also a small portion who did not have access, never used the internet, had negative attitudes towards the internet, and rated their abilities as ‘poor’ or ‘fair’. The following section of this report focuses on identifying those most likely to fall into these categories – the digitally excluded.

### 3.2. Digitally excluded

This section presents a profile of respondents who are most likely to be ‘digitally excluded’, as well as a summary of targeted subgroup’s frequency of internet use and behavioural differences between groups. Results for the purposeful homeless sample are also presented in this section.

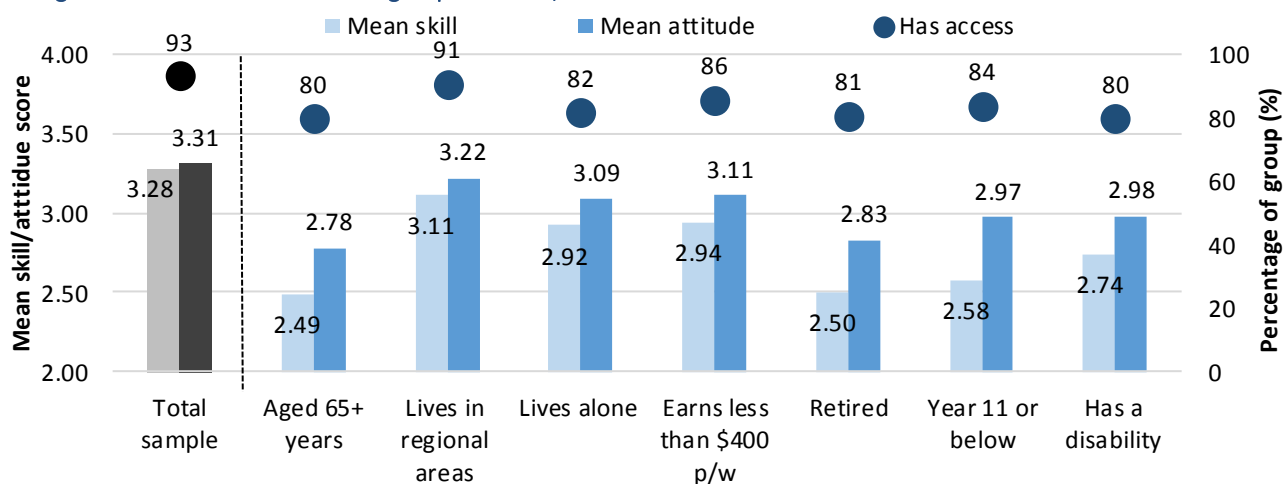
This section aims to address the research question: Which Australian’s are digitally excluded?

#### Access, skill & attitude

As discussed previously, while the ‘digital divide’ may be narrowing but there are still certain groups in society who lack the required access, skill, or motivation to use the internet. Figure 14 provides a selective summary subgroups who were consistently found to have poor access, low self-efficacy, and negative attitudes. For a complete list of differences between groups see Appendix 2: Sample composition by barrier level. Data at the total sample level is also provided for comparison purposes.

In general, respondents aged 65 years or over were least likely to have access to the internet at home or via a mobile device, most likely to have poor/fair self-efficacy, and most likely to have a negative attitude towards the internet. Other groups of interest include those living in regional (and remote) areas, those living alone, earning less than \$400 per week, retirees, those who did not complete high school, and those who identified as having a disability.

Figure 14. Common excluded subgroups – access, skill & attitude



Given the potentially confounding effect of demographic variables on each other (e.g. older respondents are more likely to be retired), a multiple regression analysis<sup>8</sup> was conducted to test the relative impact of various demographic characteristics on digital self-efficacy and internet attitude. The demographic variables included in the regressions were those identified in the literature and practice review as potential predictors of digital exclusion – that is, age group, remoteness area, household composition, employment status, education, personal income bracket, country of birth (1=Australia or 2=Other), language spoken at home (1=English only or 2=a non-English language), speaking English as a first language (1=Yes or 2=No), indigenous identification (1=Yes or 2=No), and identification as disabled (1=Yes or 2=No).

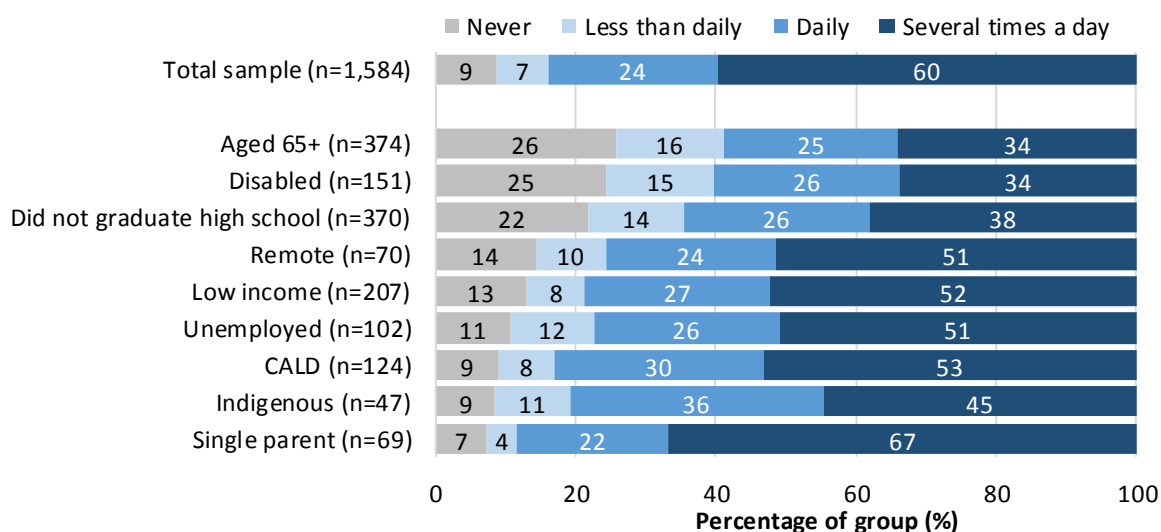
The model as a whole explained 27% of the variance in digital self-efficacy. As anticipated, age made the greatest contribution ( $\beta=-.380$ ), where an *increase* in age was associated with a *decrease* in self-efficacy. Education ( $\beta=.230$ ), employment status ( $\beta=-.070$ ), and remoteness ( $\beta=-.055$ ) also made significant contributions to the variance – where those with higher educational qualifications, employed, and living closer to major cities were associated with higher scores for self-efficacy.

Similarly, the model explained 28% of the variance in overall internet attitude. Age again made the greatest (negative) contribution ( $\beta=-.402$ ). And, as seen with self-efficacy, education ( $\beta=.210$ ) and employment status ( $\beta=-.086$ ) also made significant contributions. While slightly weaker, speaking English as a first language ( $\beta=-.069$ ) and disability status ( $\beta=.047$ ) were also associated with internet attitude scores (i.e. non-English speakers had marginally more positive attitudes and those who identified as disabled had slightly more negative attitudes).

### Target subgroups & frequency of use

Focusing on the demographic subgroups of interest, Figure 15 presents the frequency of internet use for each subgroup. Those aged 65 years or over (26%), and those who identified as disabled (25%) were the most likely groups to report never using the internet. One in five of those who did not graduate high school (22%) also reported never using the internet. While the proportion of indigenous persons and culturally and linguistically diverse (CALD) persons (i.e. speaks a non-English language at home, English is not their first language, and were born overseas) who used the internet ‘several times a day’ was slightly lower than the total sample, the proportion of ‘daily’ users was higher than average.

Figure 15. Target sample subgroups frequency of internet use



<sup>8</sup> See Appendix 1: Statistical analyses for more information on multiple regression analysis

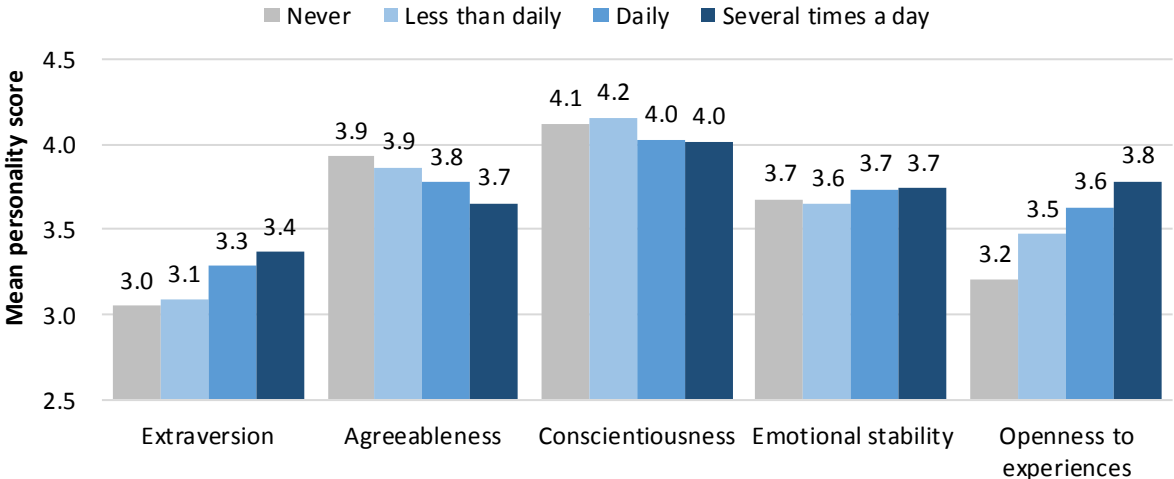
A multiple regression analysis was also conducted to test the relative impact of demographic characteristics on frequency of use (as described previously). The model as a whole explained 28% of the variance in use, with age making the greatest (negative) contribution ( $\beta=-.305$ ). Education ( $\beta=.237$ ), employment status ( $\beta=-.109$ ), disability status ( $\beta=.118$ ), and speaking English as a first language ( $\beta=-.091$ ) also made significant contributions; as did personal income ( $\beta=.056$ ) albeit, to a lesser extent. In other words, those who were younger, had a higher education level, were employed, were not disabled, were non-English speakers, and earned a higher income were more likely to be frequent internet users.

In addition to assessing the relationship between demographic characteristics and frequency of use, a hierarchical multiple regression analysis was conducted to determine the relative impact of access, self-efficacy, and attitude on frequency of use. The same demographic variables were included in the regression in the 'first step'. Home access, mobile access (1=Yes, 2=No), digital self-efficacy, and internet attitude scores were included in the 'second step'.

The second model (access, skill & attitude) accounted for an additional 36% of the variance in frequency of use, with the greatest contribution from home access ( $\beta=-.392$ ), where poorer access (i.e. 'mobile only' or 'no access') was associated with less frequent use. The second greatest contribution was from attitude ( $\beta=.284$ ), followed by mobile access ( $\beta=-.114$ ) and digital self-efficacy ( $\beta=.125$ ). In other words, those with more positive attitudes, access to a mobile device, and better self-efficacy were more likely to be frequent internet users regardless of demographic characteristics.

It is also interesting to note that those who reported never using the internet, or who used it less than daily, had marginally lower scores for the personality traits 'Extraversion' and 'Openness to experience' compared to 'daily' and 'several times a day' users who to had lower scores for 'Agreeableness'. In other words, frequent internet users were slightly more outgoing, more open, and less agreeable than infrequent users.

Figure 16. Mean personality trait scores by frequency of internet use



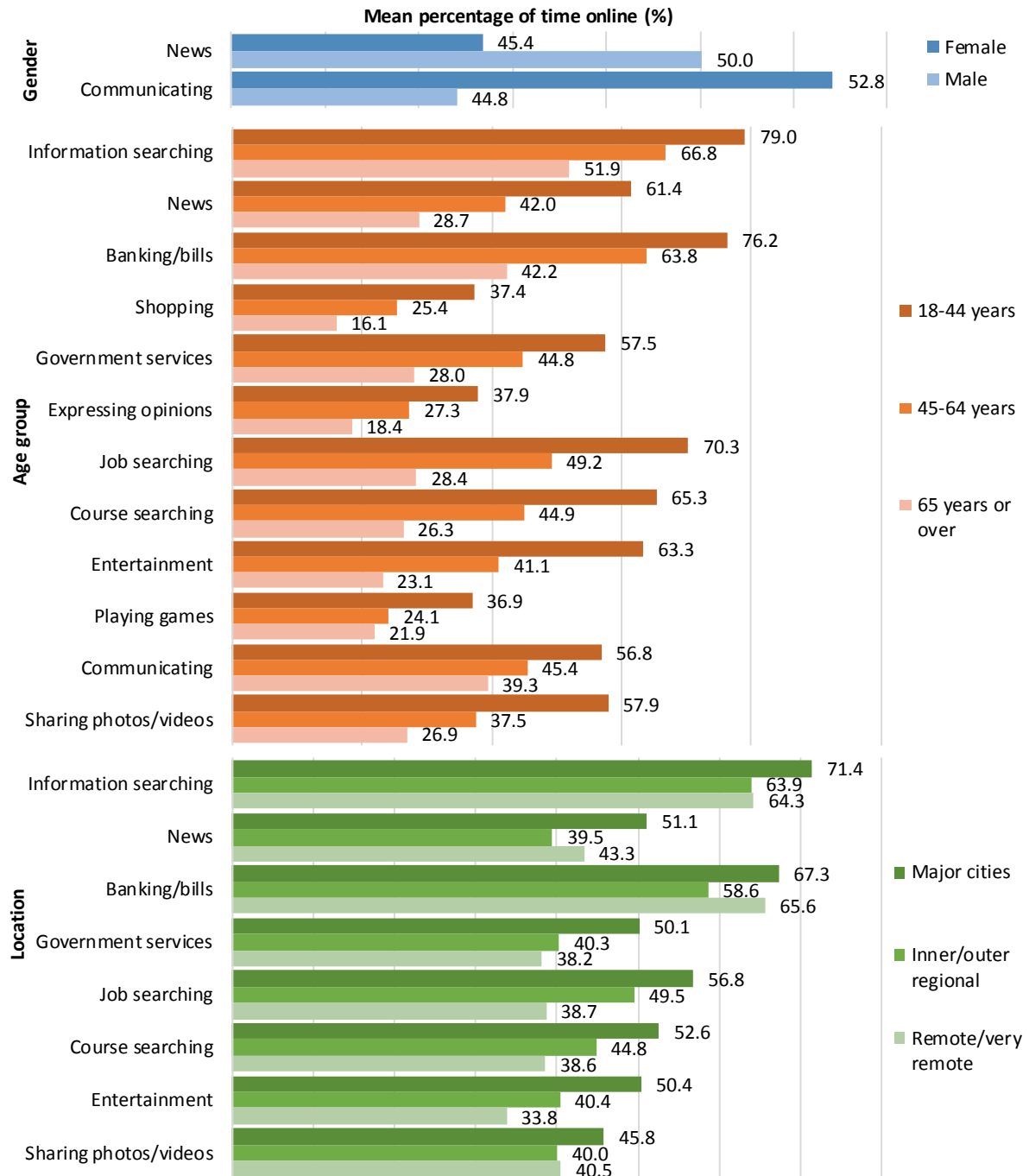


## Behaviour profiling

While frequency of use could be mapped along demographic and socio-demographic characteristics, there were also statistically significant differences<sup>9</sup> in the way different groups used the internet.

As shown in Figure 17, males were more likely to use the internet for seeking news, whereas females were more likely to use it for communicating. All behaviours were more common among 18-44 year olds, and least common among those aged 65 years or over. Searching for jobs, searching for courses, and seeking entertainment were significantly more common among major city residents compared to regional or remote residents.

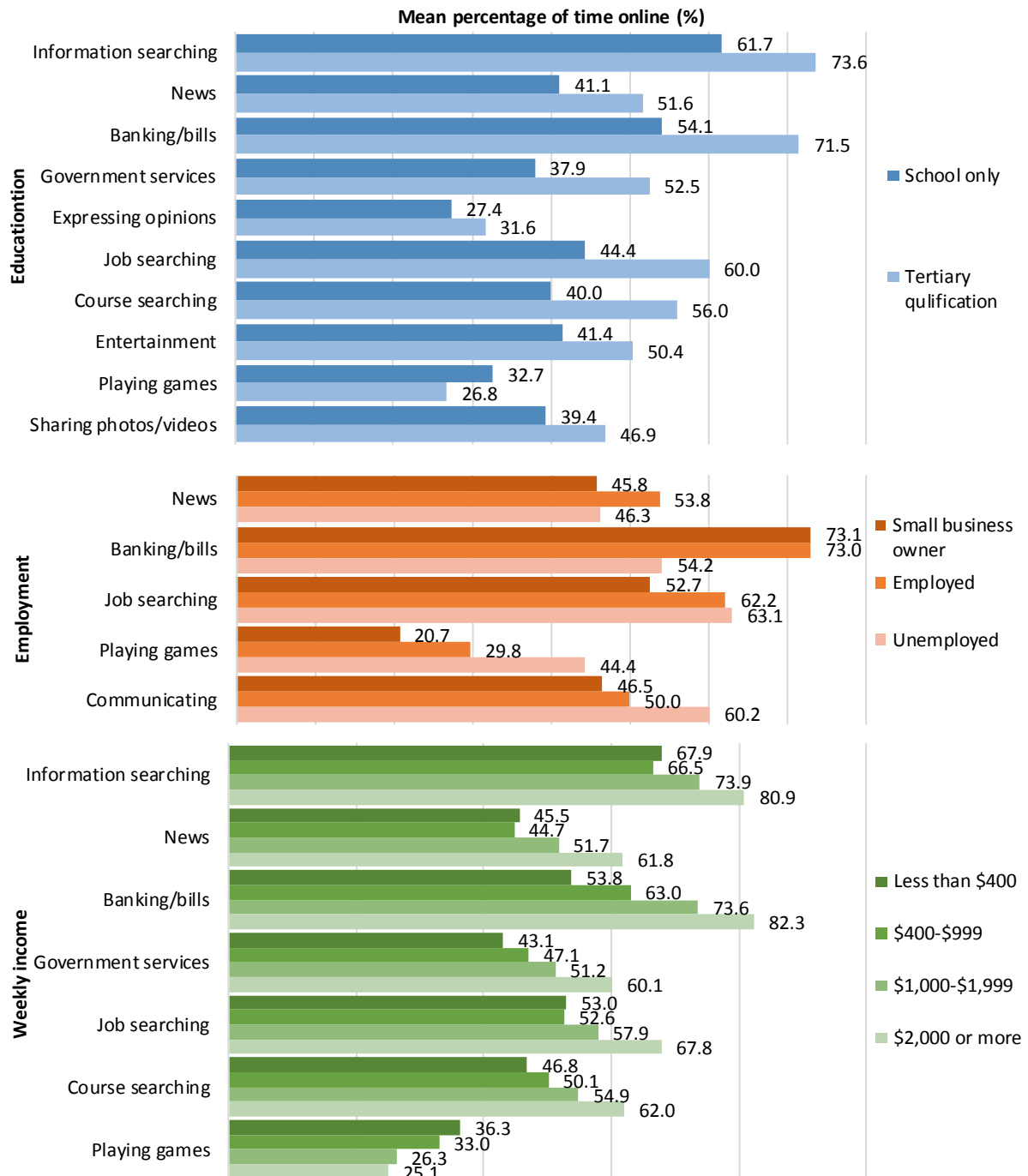
Figure 17. Significant differences in online behaviour – gender, age group, & location



<sup>9</sup> See Appendix 1: Statistical analyses for more information on significance testing

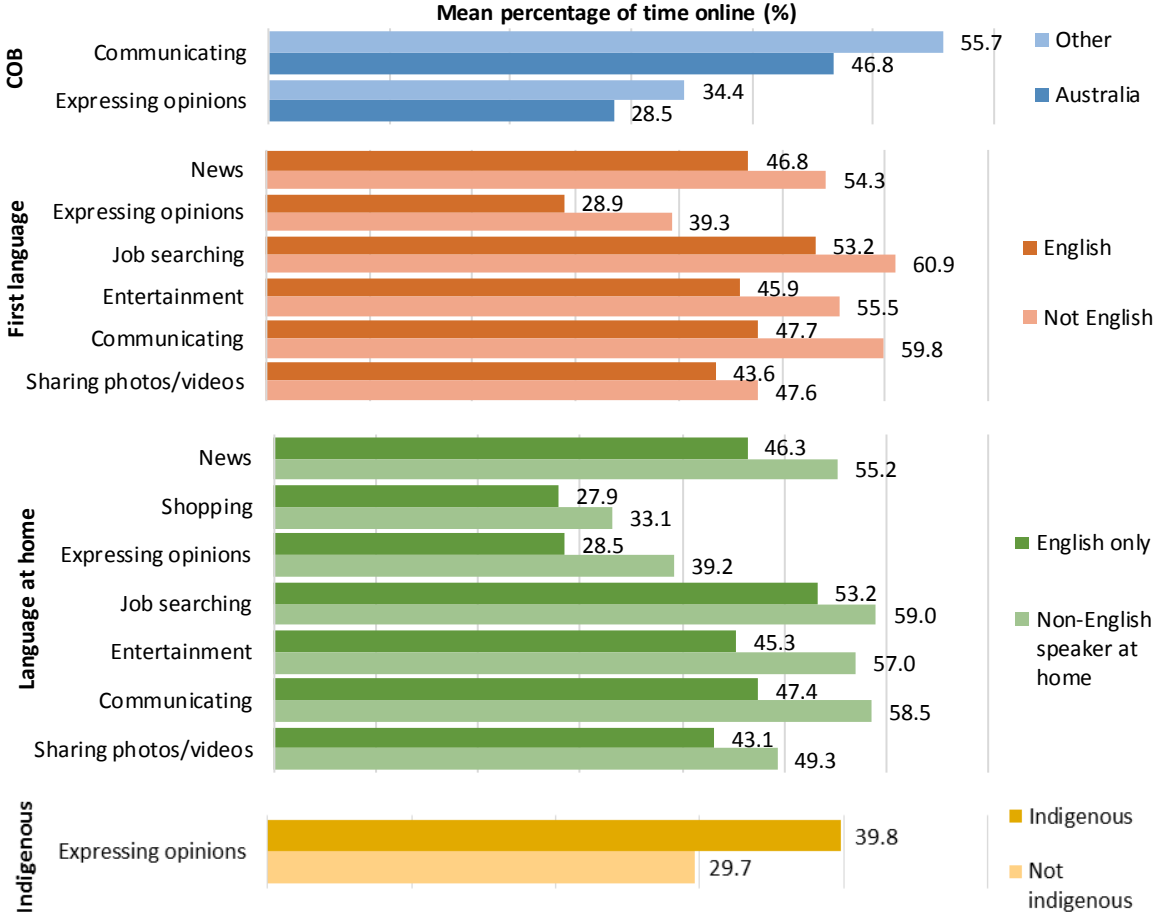
Nine of the 12 online behaviours were significantly more common among respondents with a tertiary qualification, although 'playing games' was significantly more common among those who only attended primary/secondary schooling. Respondents who were employed (including business owners) were more inclined than the unemployed to use the internet for banking and paying bills; whereas, the unemployed were more likely to use the internet for playing games and communicating. There was a moderate positive relationship between internet use and income for six of the twelve behaviours – playing games had a negative relationship with income.

**Figure 18. Significant differences in online behaviour – employment, education, & income**



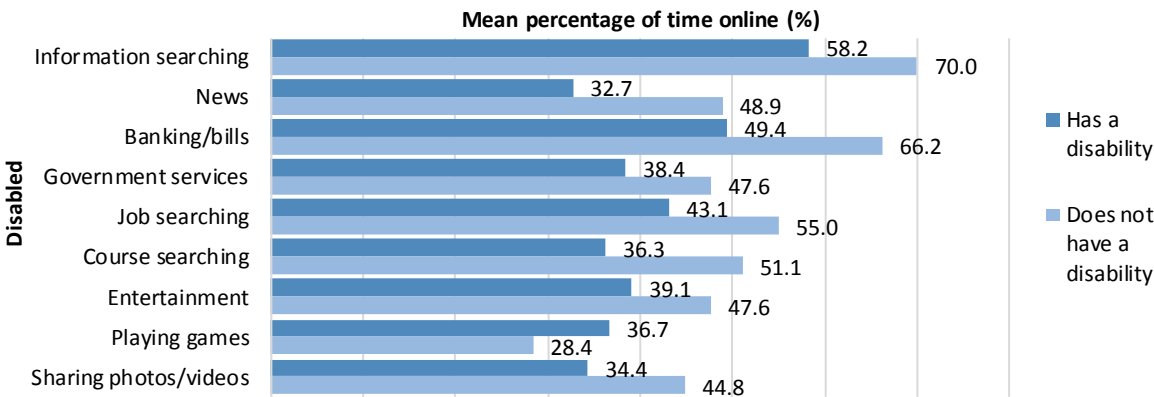
Contrary to expectation, those who were born outside of Australia, spoke English as a second language, and spoke another language at home were more likely to engage in certain online behaviours. In most cases these behaviours related to information and communication (e.g. communicating with friends/family, news, expressing opinions, etc.) – behaviours which are often easier and/or cheaper to access via the internet when seeking a non-English language or from another country. Those who identified as indigenous were significantly more likely than non-indigenous persons to express their opinion using an online forum.

Figure 19. Significant differences in online behaviour – CALD & indigenous status



Finally, those who identified as disabled were less likely than other respondents to engage in eight of the 12 online behaviours. Playing online games was more common among disabled persons.

Figure 20. Significant differences in online behaviour – disability status



## Homeless cohort

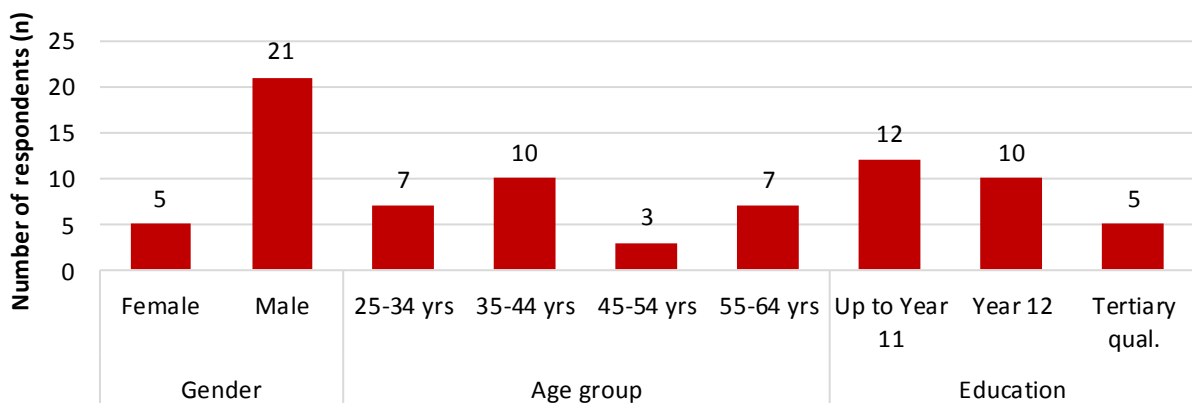
The shortened paper survey developed for the homeless cohort was made available to participants through the Big Issue – a magazine which is sold on the streets by homeless, marginalised and disadvantaged people (including persons with an intellectual or physical disability, or a mental illness). The homeless cohort included participants who were ‘sleeping rough’, as well as those living in inadequate or temporary dwellings, or those whose living arrangements does not allow them to have control of and access to space for social relations<sup>10</sup>. The homeless survey included 16 questions to measure demographic characteristics, access, skill, attitude, and online behaviour.

### HOMELESS: SAMPLE CHARACTERISTICS

‘Homeless’ respondents had a range of living situations including boarding houses (n=7), improvised housing/tent/street (n=7), and public/community housing (n=6). The homeless cohort included one respondent who identified as indigenous, two who spoke English as a second language, four who spoke a non-English language at home, and three who were born overseas. The group also included 16 respondents who identified as disabled.

The homeless cohort included 27 respondents – 21 males and 5 females, aged between 25 and 64 years. Twelve members of the homeless cohort did not finish high school, 10 completed Year 12, and 5 had a tertiary qualification.

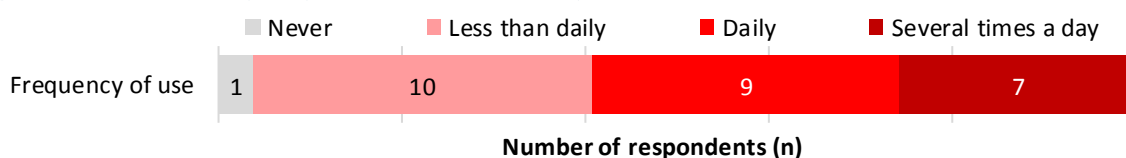
Figure 21. Homeless: Sample composition



### HOMELESS: FREQUENCY OF USE

Unlike the general community, where 60% of respondents used the internet ‘several times a day’, only 7 of the 27 homeless respondents used the internet ‘several times a day’. Nine respondents used the internet ‘daily’, and 10 used the internet ‘less than daily’. Only one individual reported never using the internet.

Figure 22. Homeless: Frequency of internet use over the past month



As with the general community survey, the shortened survey asked respondents who used the internet less than daily to indicate why they did not use it more often (n=11). Lack of access was mentioned by six respondents, four indicated that they had no interest (or no need) to use the internet more often, and one reported that they were not confident.

<sup>10</sup> Australian Bureau of Statistics (ABS) statistical definition of homelessness.

**HOMELESS: ACCESS, SKILL & ATTITUDE**

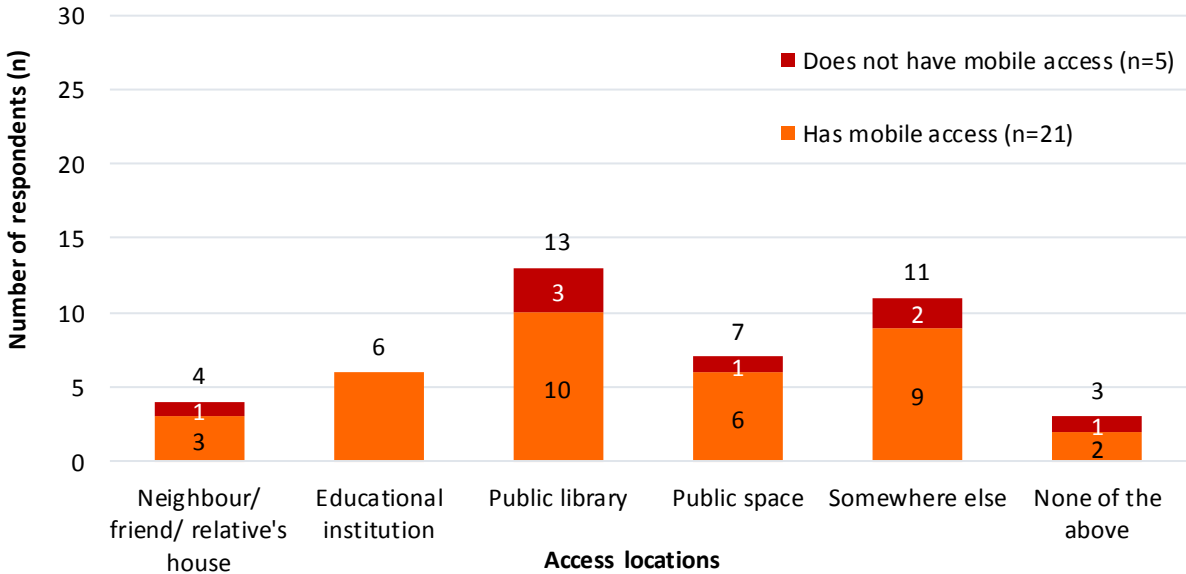
Access was measured in the shortened survey by asking respondents if they had a mobile device that could be used to access the internet and if they had accessed the internet from various locations in the previous 12 months. Skill was measured using the digital self-efficacy item (as per the general community survey). Given space and time limitations of the paper survey, the 14 item Internet Attitude Scale was reduced to four items for the homeless survey. The four items were:

- ‘I like to look up information about businesses, services, and/or products on the internet’,
- ‘I feel that the internet has allowed me to keep in touch with many people’,
- ‘I feel anxious that online communications can potentially be seen, heard, or otherwise accessed by other people’ (reverse coded), and
- ‘I would prefer to go online to conduct most of my banking’.

Twenty-one of the homeless respondents who participated had a mobile device which could be used to access the internet. Four of the five who did not have a mobile device had accessed the internet from other locations in the previous 12 months. Only one homeless respondent reported having no access to a mobile device and not accessing the internet from any location in the previous 12 months – the same individual who reported ‘never’ using the internet.

The most common locations for accessing the internet among the homeless cohort was at a public library (n=13), and in a public space (n=7). Eleven had accessed the internet from a location not listed on the survey (e.g. “Centrelink”, “Other people’s mobiles”, “From home”).

**Figure 23. Homeless: Internet access locations (past 12 months)**

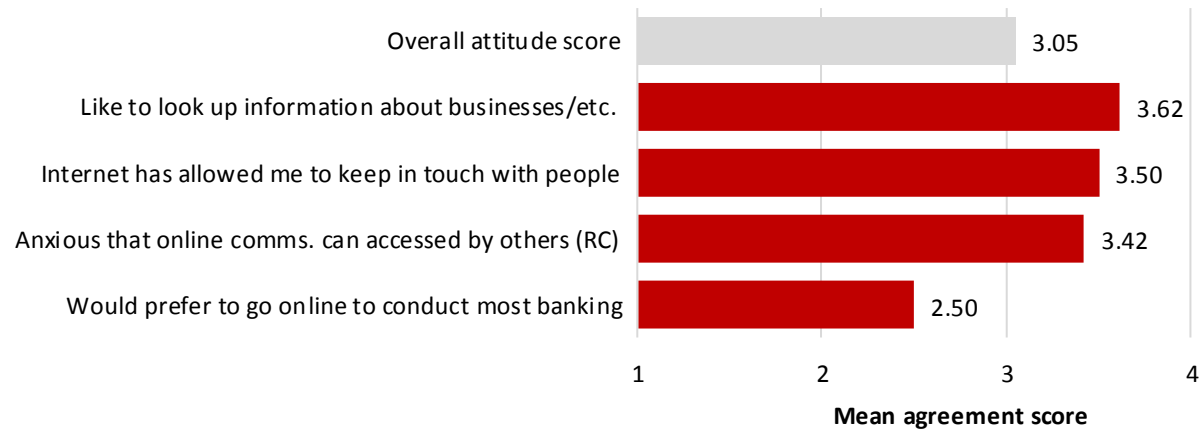


As seen in the general community study, the majority of homeless respondents (n=17) rated their digital self-efficacy as ‘good’, ‘very good’, or ‘excellent’. Six rated their abilities as ‘fair’ and only one respondent felt their internet abilities were ‘poor’.

Homeless respondents generally agreed with the statements ‘I like to look up information about businesses, services, and/or products on the internet’ (mean=3.62), ‘I feel that the internet has allowed me to keep in touch with many people’ (mean=3.50), and ‘I feel anxious that online communications can potentially be seen, heard, or otherwise accessed by other people’ (mean=3.42). Unlike the general community, homeless respondents typically *disagreed* with the statement ‘I would prefer to go online to conduct most of my banking’ (mean=2.50).

Overall, homeless respondents had relatively neutral attitudes towards the internet (mean=3.05).

**Figure 24. Homeless: Mean attitude toward the internet**



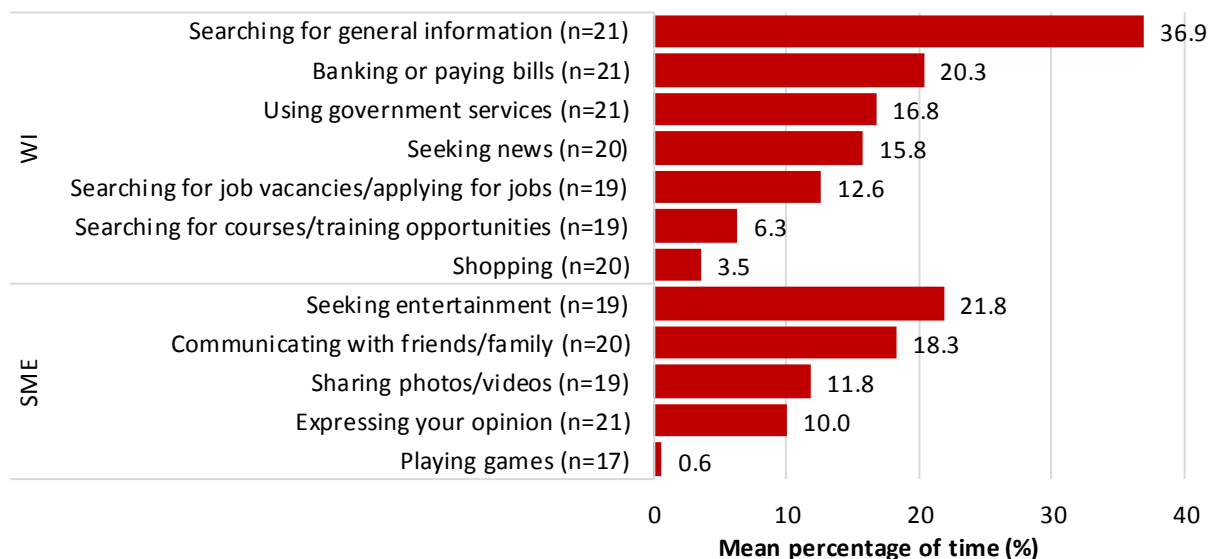
(RC) indicates items that were reverse coded for generating overall attitude scores

### HOMELESS: BEHAVIOUR

All 12 behaviours were included in the shortened homeless survey, which asked respondents to indicate the percent of time they would use the internet compared to non-internet alternatives. Some respondents did not provide a response to one or all of the items. Of those who provided a valid response to the online behaviour questions (n=17-21), the average ‘percent of time’ was 14.5% across all behaviours. As anticipated, this is much lower than the general community survey.

While the figures are significantly lower, the most common behaviour among the homeless cohort was still ‘searching for general information’ (mean=36.9% of the time), and the least common behaviour was still ‘playing games’ (mean=0.6% of the time).

**Figure 25. Homeless: Online behaviour**



### Summary of the digitally excluded

As found in previous research, there are certain groups in Australia who are at risk of being digitally excluded. Most notably the elderly (aged 65 years or over), who often lack access to the internet, rate their abilities as 'poor' or 'fair', and have relatively negative attitudes towards the internet. When age is controlled for, education level, employment status, and disability status continue to affect perceived skill, attitude, and frequency of use. In other words, those with a lower education level, not working, or disabled are more likely to be digitally excluded.

While general trends can be observed between different demographic groups, it is interesting to note that even among those who use the internet, there is significant variation in *how* they are engaging. For example, those on a lower income (less than \$400 per week) were less likely than those on higher incomes to use the internet for WI behaviours, such as information searching, news, banking, or government services; but more likely to use it for recreation (i.e. playing games). This highlights the potential for a behaviour-based analysis of different internet users.

It is also interesting to note that 21 of the 27 homeless persons who participated in the study had a mobile device which could be used to access the internet and only one person never used the internet. While these figures might suggest that homeless persons are not entirely excluded from the digital environment, their online *behaviours* are far less common than the general community. This may be related to access difficulties, as well as the high number of homeless persons who do not have tertiary education and identify as disabled – given the impact of education and disability on digital inclusion discussed above.

### 3.3. Internet user typologies

This section presents results from a behaviour-focused analysis of internet users. Results include a summary of the typology groups identified and specific behavioural characteristics of each group, as well as a comparison of access, skill & attitude by group. This section addresses the research question: What are the behaviour based typologies of internet users?

#### Typology groups

In order to identify a behavioural-based typology of internet use a two-step cluster analysis<sup>11</sup> was conducted. The cluster analysis was run in SPSS and included the two behaviour traits "WI behaviours" and "SME behaviours", as well as respondent's identification as either an internet user (used the internet 'several times a day', 'daily', 'at least weekly', 'once a month', or 'less than once a month') or a non-user (reported 'never' using the internet).

The model identified five typology groups (illustrated in Figure 26 on the following page):

- **'Non-users'** (n=136) represent the small group of respondents who never use the internet;
- **'Samplers'** (n=276) are those who engage with the internet to some degree but relatively rarely compared to other groups;
- **'Socialisers'** (n=282) are the only group who are more likely to engage in SME behaviours than WI ones, albeit only slightly;
- **'Pragmatics'** (n=400) are among the heavier internet users, however they largely prefer WI over SME behaviours; and,
- **'Enthusiasts'** (n=490) are the largest group and turn to the internet most of the time regardless of the type of behaviour.

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<sup>11</sup> See Appendix 1: Statistical analyses for more information on cluster analysis

Figure 26. Internet behaviour typologies

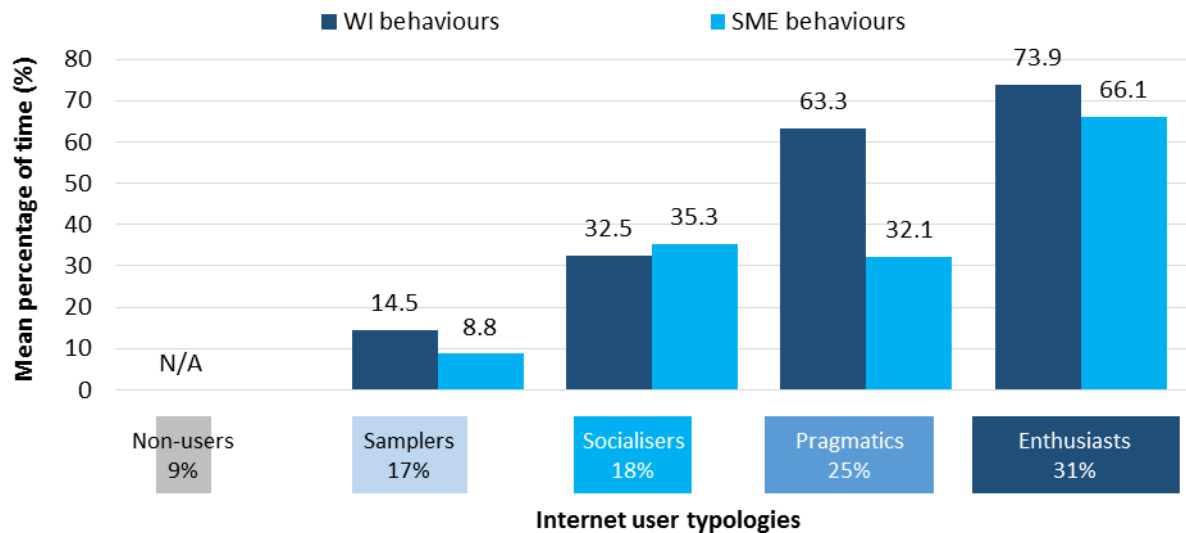
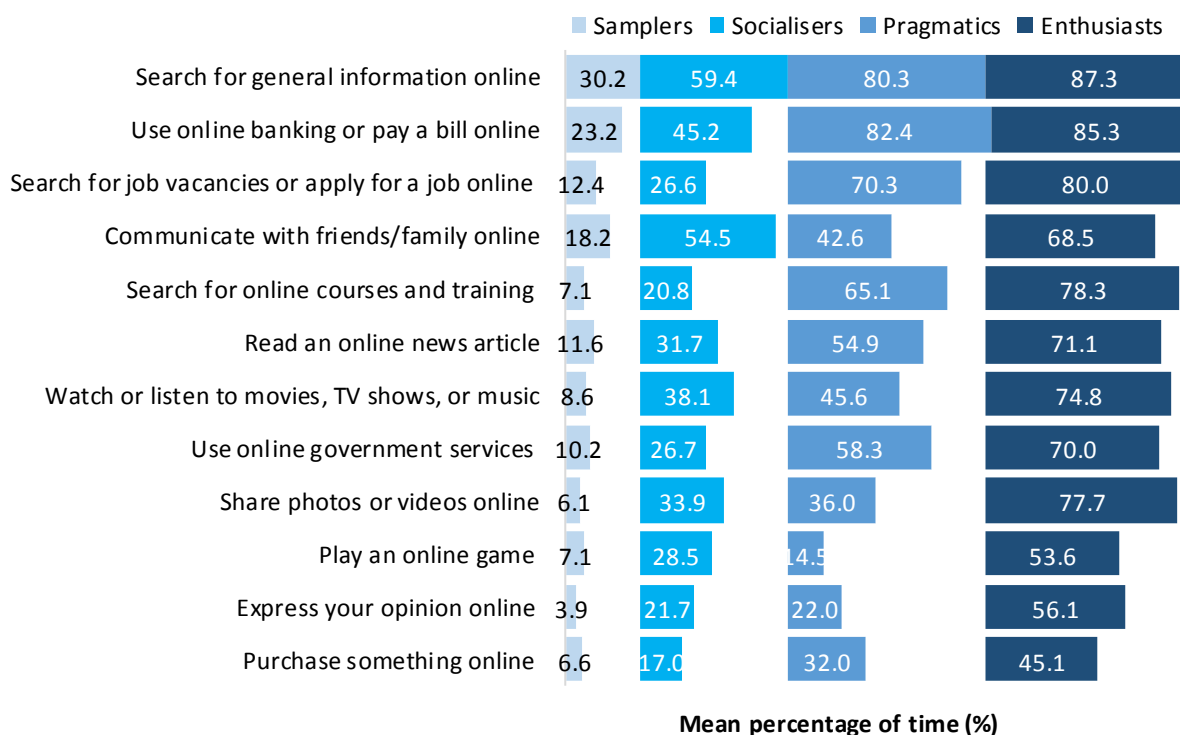


Figure 27 provides a summary of the ‘percent of time’ each group uses the internet for specific behaviours. ‘Non-users’ are not included in the figure as they were not asked about online behaviour.

‘Samplers’ use the internet significantly less than other groups, however they will go online at least 20% of the time to search for general information or to pay bills/conduct banking. ‘Socialisers’ use the internet significantly more than ‘Samplers’ and significantly less than other user groups. ‘Socialisers’ were more likely than ‘Pragmatics’ to use the internet for communicating with friends/family and playing games, and may be underutilising the internet for productive behaviours such as online government services, job seeking/applications, and training opportunities. In contrast, ‘Pragmatics’ were more likely to use the internet for WI behaviours (e.g. searching for information, seeking news, shopping, etc.). ‘Enthusiasts’ were significantly more likely than all other groups to use the internet for almost every behaviour. The only exception being banking or paying bills online, where ‘Pragmatics’ also use the internet around 80% of the time.

Figure 27. Percent of time online by typology group





The demographic characteristics of each typology group were reviewed – a summary of these differences is provided in Figure 28 (on the following page).

**‘Non-users’** were predominantly older adults, with 71% aged over 65 years. The group also included a significantly greater proportion of respondents from regional (41%) and remote (7%) areas compared to other groups. Given the relative age of ‘Non-users’, it is understandable that many are retired (71%) and either live alone (43%) or as a couple without dependent children (36%). The group are also dominated by respondents without any tertiary qualifications (81%), includes a significantly greater proportion of low income earners (54%), and has the greatest representation from disabled persons (27%).

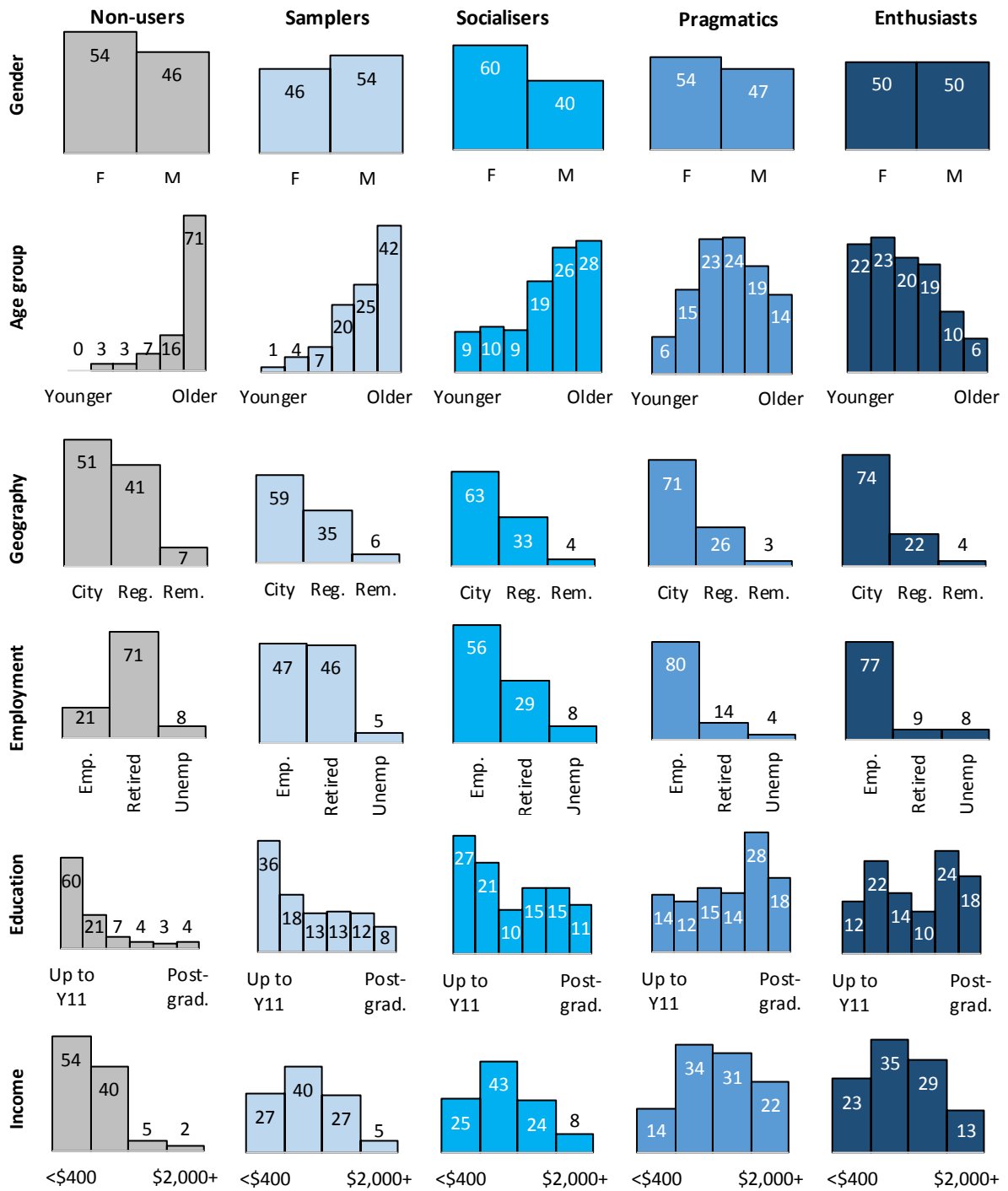
**‘Samplers’** are slightly younger than ‘Non-users’, although there is still strong representation from older respondents with over two-thirds aged 55 years or above (68%). They are the only group with more males (54%) than females (46%). Around one quarter of ‘Samplers’ live alone (22%), and a further 26% live as a couple without children. Many are also retired (46%), and do not have any tertiary qualifications (54%). The group includes 27% who earn less than \$400 per week, but also 27% who earn between \$1,000 and \$1,999 per week.

**‘Socialisers’** are toward the ‘older’ middle-aged brackets (45% aged between 45 and 64 years) and come from a range of household types (most commonly couples with dependent or non-dependent children (45%)). Three in five (60%) are females, half are working (56%), while just over one in four (29%) are retired. Half have a tertiary qualification (52%) and two in five earn between \$400 and \$999 per week (43%).

**‘Pragmatics’** are toward the ‘younger’ middle-age brackets with around half aged between 35 and 54 years (47%). The most common living situation involved couples with dependent children (36%), and the majority of ‘Pragmatics’ were working in some capacity (80%). ‘Pragmatics’ also include the largest proportion of respondents with post-secondary qualifications (75%), and the largest proportion of respondents who earn over \$1,000 per week (53%).

**‘Enthusiasts’** are generally younger than other groups, with 65% aged between 18 and 44 years. Around one in three are couples with dependent children (32%), and around one in eight live in a group household (12%). Similar to ‘Pragmatics’, they are typically working in some capacity (77%) and have a post-secondary qualification (66%). Around two in five earn over \$1,000 per week (42%). ‘Enthusiasts’ also include the largest proportion of respondents from cultural and linguistically diverse backgrounds – with 20% who speak a non-English language at home, and 15% for whom English is not their first language.

Figure 28. Summary profile of typology groups (% of group)

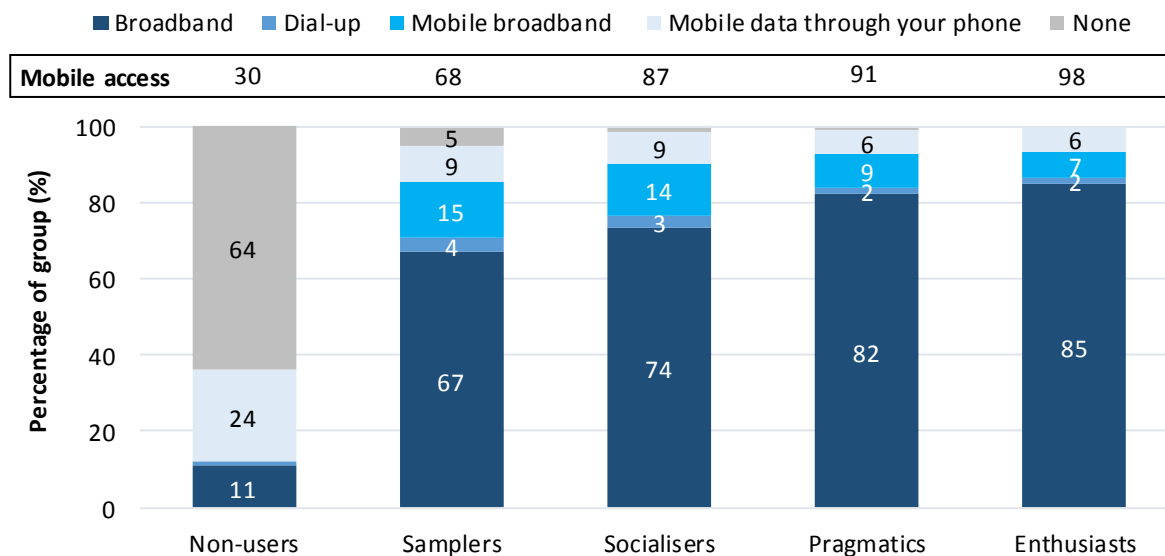


## Access, skill & attitude by typology group

In addition to online behaviour and demographic characteristics, significant differences were observed between user groups in terms of internet access, digital self-efficacy, and attitude towards the internet.

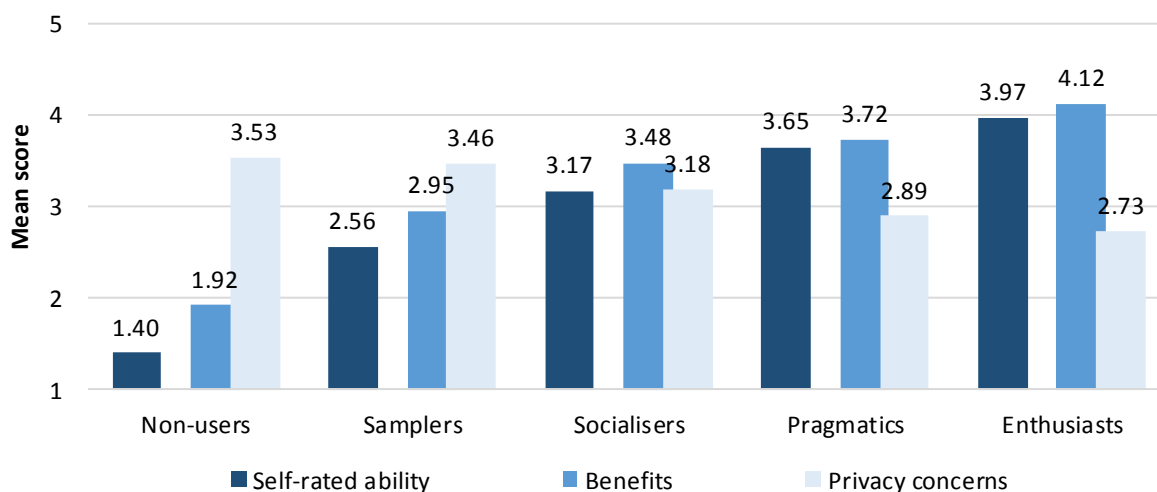
As illustrated in Figure 29 below, almost two in three 'Non-users' (64%) did not have internet access at home and less than one in three (30%) had a mobile device which could be used to access the internet. The vast majority (95% or more) of 'Samplers', 'Socialisers', and 'Pragmatics' had some form of access either at home or via a mobile device. In comparison, all 'Enthusiasts' had access at home and 98% had access through a mobile device.

Figure 29. Internet access by typology group



Self-efficacy and attitude differed between typology groups. 'Non-users' typically rated their internet abilities as 'poor' or fair (mean=1.40), had lower scores for the perceived benefits of the internet (mean=1.92), and higher scores for privacy concerns (mean=3.53). 'Samplers' and 'Socialisers' had more positive attitudes and higher self-rated abilities compared to 'Non-users' but both groups were still relatively concerned about online privacy. At the other end of the scale, 'Enthusiasts' had the highest self-efficacy ratings (mean=3.97), the highest 'Benefits' score (mean=4.12), and the lowest score for 'Privacy concerns' (mean=2.73).

Figure 30. Digital self-efficacy & attitude by typology group



Unlike 'Non-users', who generally had negative attitudes towards all aspects of the internet, 'Samplers', 'Socialisers' and 'Pragmatics' had varying attitudes toward different features of the internet. For example, 'Samplers' and 'Socialisers' tended to agree with the statements 'I like to look up information about businesses, services, and/or products on the internet' (mean=3.58 and 4.04 respectively) and 'I feel that the internet has allowed me to keep in touch with many people' (mean=3.45 and 4.23 respectively). At the same time, both groups were anxious that their personal information may be available over the internet (mean=3.72 and 3.62 respectively) and were uncomfortable using their credit cards online (mean=3.72 and 3.35 respectively).

'Pragmatics' has mostly positive attitudes. Their highest rated attitude statements were 'I like to look up information about businesses, services, and/or products on the internet' (mean=4.34), and 'I would prefer to go online to conduct most of my banking' (mean=4.11). 'Enthusiasts' had significantly higher ratings for almost all attitude statements compared to 'Non-users', 'Samplers', and 'Socialisers'. They typically agree (mean=4.00 or higher) that they like to look up information about businesses and services, prefer to search for job vacancies online, prefer to go online to conduct their banking, enjoy using the internet to pass the time or have fun, feel that the internet has allowed them to keep in touch, and enjoy using the internet for real time communications.

### Summary of internet user typologies

Using the two behaviour traits "WI behaviours" and "SME behaviours" and respondent's identification as either an internet user or a non-user, five basic behavioural groups were identified:

1. Those who never use the internet ('Non-users')
2. Those who rarely use the internet ('Samplers')
3. Those who sometimes use the internet, but prefer games and communicating ('Socialisers')
4. Those who often use the internet, and greatly prefer WI behaviours ('Pragmatics'), and
5. Those who almost always use the internet ('Enthusiasts')

These five groups broadly map to the demographic characteristics described previously, where 'Non-users' are primarily older, retired, adults without a tertiary qualification, many of whom have a disability; and 'Enthusiasts' are primarily younger, employed, with a tertiary qualification, many of whom earn over \$1,000 per week. The groups also map along the 'barrier' levels discussed previously where self-rated ability and positive views of the internet are higher and privacy concerns are lower among the heavier user groups.

With a basic understanding of the behaviour based typologies of internet users, the next section reviews these groups in more detail to better understand the challenges and facilitators faced by different types of users.

### 3.4. Barriers & enablers to more use

This section presents the reasons for infrequent (or non-) use, as well as concerns and suggestions for encouraging uptake. The research question addressed in this section is: What are the barriers & enablers to use/more use?

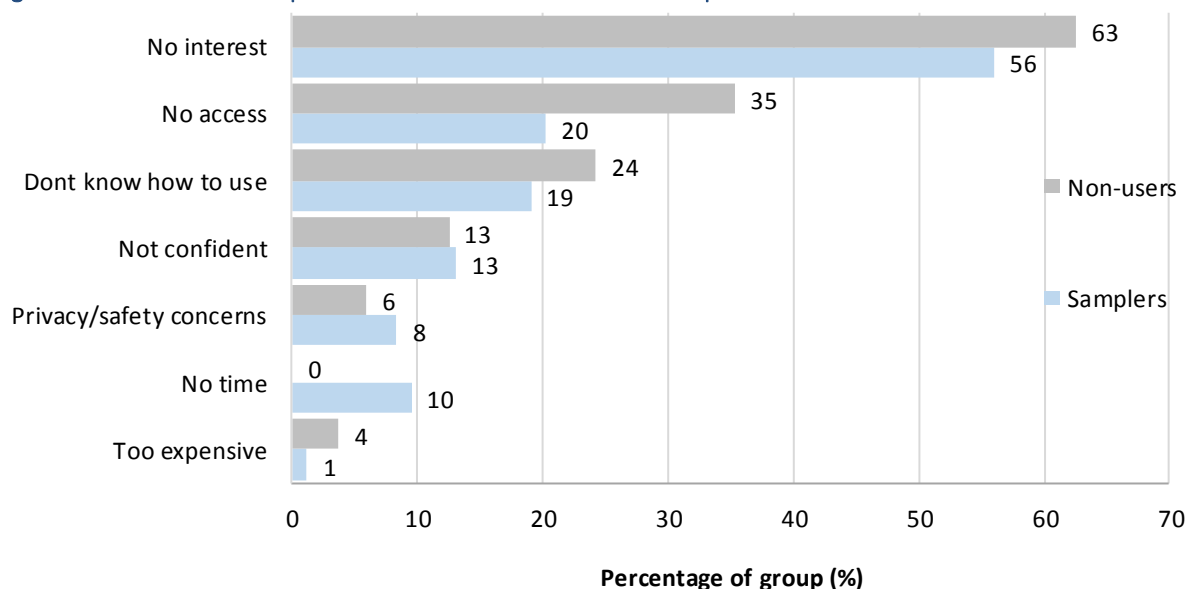
#### Challenges by typology group

Those who did not use the internet often were asked to provide the reason(s) for why they did not use it more frequently. Almost two in three ‘Non-users’ indicated they were just not interested (63%), while one in three reported issues with access (35%), and just under one quarter indicated that they do not know how to use the internet (24%).

Among ‘Samplers’ who used the internet less than daily, 56% were not interested, 20% did not have access, and 19% do not know how to use the internet. Compared to ‘Non-users’, a more prominent issue for ‘Samplers’ was lack of time (10% vs. 0%).

The remaining three user groups (‘Socialisers’, ‘Pragmatics’, and ‘Enthusiasts’) were excluded from analysis due to relatively small number of respondents who used the internet less than daily (n < 15).

Figure 31. Reasons for infrequent internet use – ‘Non-users’ & ‘Samplers’

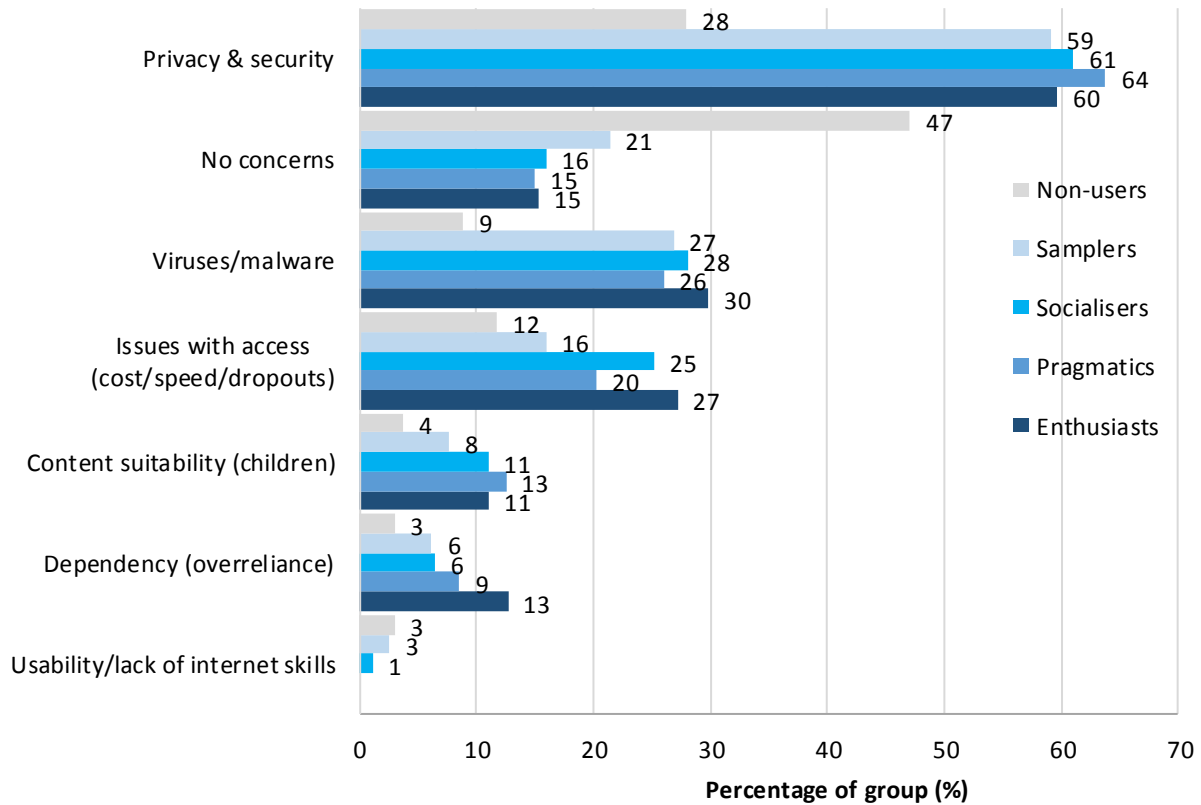


Base: Used the internet less than daily or never; ‘Non-users’ n=136, ‘Samplers’ n=84

Figure 32 provides a summary of respondents' greatest concerns about using the internet. Despite their negative attitude scores, 'Non-users' were the most likely group to indicate that they did not have any concerns about using the internet (47%).

Among user-groups, around three in five (59%-64%) mentioned privacy and security as their greatest concern. 'Socialisers' and 'Enthusiasts' were more likely to mention viruses or malware concerns, or issues with access (e.g. cost, speed, dropouts). While 'Socialisers' (11%), 'Pragmatics' (13%), and 'Enthusiasts' (11%) were more likely than 'Non-users' and 'Samplers' to mention concerns about content suitability, particularly for children. It is worth noting that just over one in eight 'Enthusiasts' were worried that they were becoming too dependent on the internet (13%).

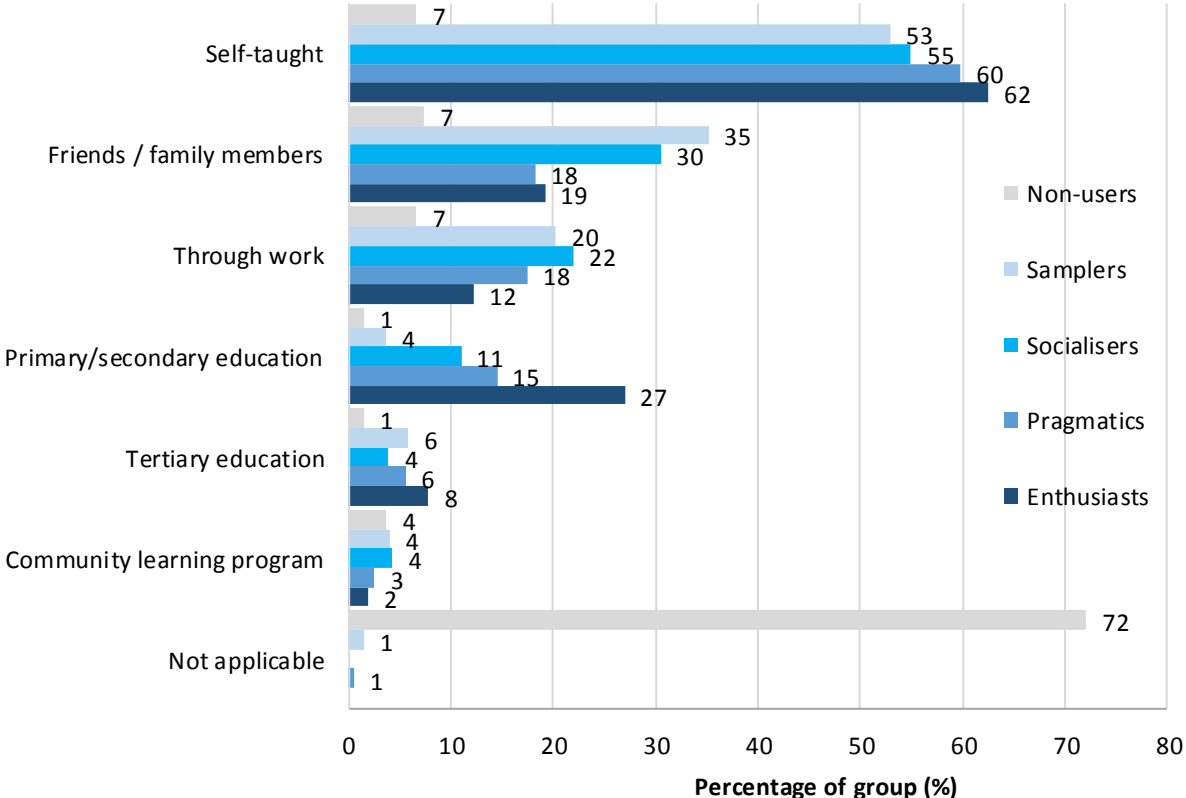
**Figure 32. Greatest concerns about the internet by typology group**



When respondents were asked where they first learned how to use the internet, just under three in four 'Non-users' indicated that this question was 'not applicable' to them (72%), while only 7% were self-taught (compared to over 50% for all other groups).

'Samplers' (35%) and 'Socialisers' (30%) were more likely to have learned from their friends or family members. Learning through primary and secondary education was only selected by only 1% of 'Non-users' compared to over one in four (27%) 'Enthusiasts'. 'Samplers' (20%), 'Socialisers' (22%), and 'Pragmatics' (18%) were also more likely to mention learning through work compared to 'Non-users' and 'Enthusiasts'.

Figure 33. Where internet skills first taught by typology group



## Encouragement by typology group

Table 2 provides the top 3 suggestions provided by each group when asked what would encourage them to use the internet more often for each behaviour. While there was some commonality, the suggestions often varied between user groups. For example, for online shopping most groups mentioned ‘if there is a need/no other option’ and ‘improve privacy/security’, but only ‘Enthusiasts’ mentioned ‘improve overall service/experience’ as one of their top 3 suggestions (26%). Given that ‘Enthusiasts’ are also likely to engage in online shopping, this presents an opportunity for increasing their uptake by improving aspects of the overall service (e.g. faster/more convenient delivery).

**Table 2. Top 3 suggestions to encourage future uptake by behaviour and typology group**

Behaviour	Typology	Would use the internet more . . .		
		1st most common	2nd most common	3rd most common
Searching for information^	Samplers	There is a need	Better options available	More convenient/easy to use
	Socialisers			
Seeking news	Samplers	There is a need	Better options available	Prefer alternative options
	Socialisers			
	Pragmatics	Better options available	More convenient/easy to use	There is a need
	Enthusiasts			
Banking or paying bills	Samplers	Improve security/privacy	There is a need	More convenient/easy to use
	Socialisers		*	
	Pragmatics			
	Enthusiasts			
Shopping	Samplers	There is a need	Improve security/privacy	Prefer alternative options
	Socialisers		Better options available	Improve security/privacy
	Pragmatics	Better options available	There is a need	Improve security/privacy
	Enthusiasts		Improve service/experience	There is a need
Using government services	Samplers	There is a need	More convenient/easy to use	Prefer alternative options
	Socialisers			More advertising/support
	Pragmatics			Improve security/privacy
	Enthusiasts			
Expressing your opinion	Samplers	There is a need	Improve security/privacy	Prefer alternative options
	Socialisers			Improve service/experience
	Pragmatics			
	Enthusiasts			
Searching for jobs	Samplers	There is a need	More convenient/easy to use	Better options available
	Socialisers			
	Pragmatics		*	*
	Enthusiasts			
Searching for courses	Samplers	There is a need	More convenient/easy to use	*
	Socialisers			More advertising/support
	Pragmatics		*	*
	Enthusiasts			
Seeking entertainment	Samplers	Prefer alternative options	Better access	There is a need
	Socialisers	Better access	Better options available	Need more time
	Pragmatics			
	Enthusiasts			
Playing games	Samplers	Need more time	There is a need	Better options available
	Socialisers		Better options available	More advertising/support
	Pragmatics			There is a need
	Enthusiasts		More advertising/support	
Communicate with friends/family	Samplers	There is a need	Prefer alternative options	Better access
	Socialisers			Better options available
	Pragmatics			Improve security/privacy
	Enthusiasts			*
Sharing photos/videos	Samplers	Improve security/privacy	There is a need	Increase skill/knowledge
	Socialisers	There is a need	Improve security/privacy	
	Pragmatics	Improve security/privacy	There is a need	Increase skill/knowledge
	Enthusiasts		*	*

^Pragmatics & Enthusiasts not included due to small sample size  $n < 5$

\*Category not included due to small sample size  $n < 5$



### Summary of barriers & enablers

While access and ability were identified as potential reasons for infrequent internet use by ‘Non-users’ and ‘Samplers’, the most common response from both groups was simply a lack of interest. For the majority of ‘Non-users’ (who never learned how to use the internet), this may be the result of insufficient knowledge regarding how to use the internet, and insufficient understanding of how the internet could be beneficial. While the majority of ‘Samplers’ were often disinterested in using the internet for specific behaviours, many would use it if there was a need to do so. It is important to note that the most common suggestions to encourage future uptake often varied by user group. As such, any interventions designed to encourage specific behaviours should take into account the target audience as well as the specific behavioural barriers.

The next section goes beyond the challenges faced by different internet users in an effort to better understand how internet users *started* to engage with the internet.

## 3.5. Pathways

In this section, the research question of ‘What are the pathways different groups take from non- to moderate- to high-users?’ is addressed. Findings are presented from an exploratory qualitative analysis of internet users’ first online activities, as well as differences between user groups.

### Journey to internet use

Respondents who identified as internet users were asked to participate in a short qualitative exercise to determine how they first started using the internet. Respondents were asked to recall the first online activity they engaged in, followed by additional activities (up to ten responses were captured).

Figure 34 provides a visual summary of all activities mentioned where larger words represent more common activities and smaller words represent activities that were mentioned less often. The most common responses related to **communication** (e.g. setting up or using email), and **seeking information** (e.g. using Google, or “*looked up news*”). **Entertainment** was the next most common activity, primarily in relation to playing games, or searching for music/videos. **Socialising/networking** (via social networking sites) was also popular (e.g. Facebook, Twitter). Some respondents mentioned **managing finances** (e.g. online banking, bookkeeping), **transactions** (e.g. eBay, “*purchased something*”), or using **online services** (e.g. booking travel accommodation, doing taxes). A small number of respondents reported that their first online activities were **for study/school** (e.g. completing an assignment or finding journal articles for an essay) or that they used the internet for **work-related** purposes (e.g. “*work related data sharing*”, “*advertising my business*”). **Other** (less frequent) activities included file sharing and technical skills (such as programming or coding). As anticipated, some respondents could not recall their first online activities (**Not sure / nothing else**).

Figure 34. Word Cloud – online activities

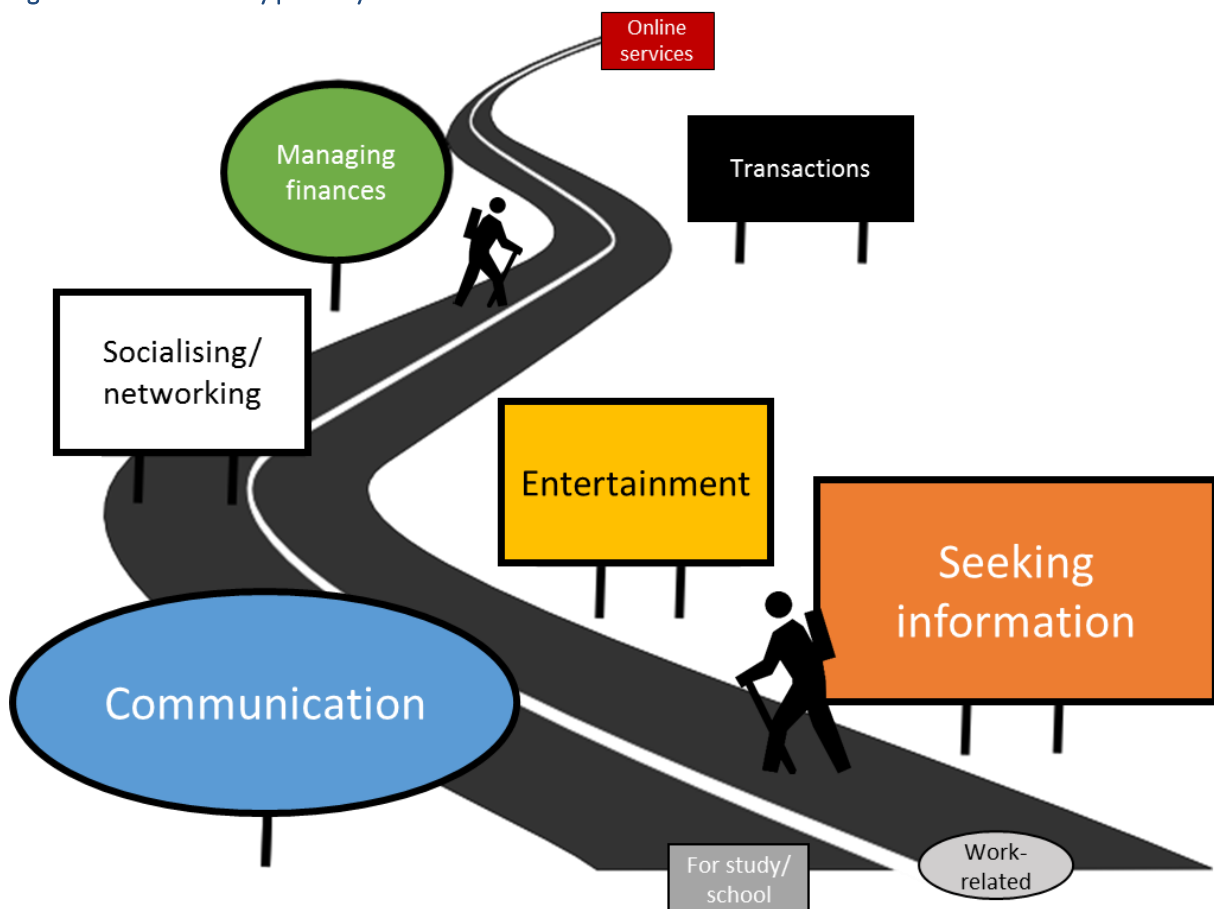


Coded responses to the qualitative exercise were further by examining frequency patterns between the first three nominated activities. Figure 35 provides a visual representation of this exploration.

Those whose first online activity was **communication** most often moved on to **seeking information**, and vice versa. While less common, when asked to recall their 'first step' some respondent's mentioned a 'trigger point' such as **for study/school** (most common among those aged 18-44 years) or that the activity was **work-related** (most common among those aged 65 years or over). Regardless of the first activity recalled, **communication** and **information seeking** usually followed. Focusing on the most common starting points, the second step was often a combination of **entertainment** and/or **socialising/networking**, followed by more involved activities such as **managing finances, transactions**, or using **online services**.

At a broad level, these findings indicate that internet users tended to start with quite generalised behaviours, which lead to slightly more advanced leisure-related behaviours, before proceeding to activities requiring more developed skills. As such, interventions designed to encourage 'Non-users' to take their 'first step' would be advised to focus on introductory tasks such as email and browsing search engines. Alternatively, interventions to help 'Samplers' get the more out of the internet could focus on leisure and social activities (e.g. social media); whereas interventions for those already engaging in leisure and social activities ('Socialisers') could focus on activities such as online banking, shopping, or using online services.

Figure 35. Online activity pathway



## Journey to use by typology group

Table 3 provides a simple rank order for each user group based on the most frequently mentioned activities. **Communication** and **seeking information** were the top two responses provided by all groups, although ‘Pragmatics’ were the only group to mention **seeking information** more often than **communication** (albeit only marginally). ‘Samplers’ were more likely to indicate that they were **not sure** about their initial online activities, they were also more likely to mention using the internet for **work-related** activities. As expected, ‘Socialisers’ and ‘Enthusiasts’ were more likely to mention **socialising/networking**; while ‘Enthusiasts’ and ‘Pragmatics’ were more likely to mention **study/school** activities.

While there are some differences in the ‘steps’ taken by different users, the progression between easy and generalised tasks to more advanced and specialised ones is relatively consistent, regardless of typology group.

**Table 3. First online activities by typology group – frequency order**

Frequency Order	Samplers	Socialisers	Pragmatics	Enthusiasts
1	Communication	Communication	Seeking information	Communication
2	Seeking information	Seeking information	Communication	Seeking information
3	Not sure / nothing else	<b>Socialising/networking</b>	Entertainment	Entertainment
4	Work-related	Entertainment	For study/school	<b>Socialising/networking</b>
5	Entertainment	Managing finances	Managing finances	For study/school
6	Managing finances	Work-related	Work-related	Managing finances
7	<b>Socialising/networking</b>	For study/school	<b>Socialising/networking</b>	Transactions
8	Other	Transactions	Transactions	Work-related
9	For study/school	Not sure / nothing else	Not sure / nothing else	Not sure / nothing else
10	Transactions	Other	Other	Other
11	Online services	Online services	Online services	Online services

### Summary of pathways

While the concept of an internet user’s ‘journey to use’ is difficult to measure, qualitative findings from this study provide some insight into the general pathway taken by internet users. Typically, the path begins with relatively generalised behaviours (e.g. email, Google), or behaviours related to necessity (e.g. for work or study); these behaviours are often followed by leisure-related activities before progressing to more advanced or technical ones.

Despite minor differences between specific activities of user groups, this pattern is relatively consistent and presents an opportunity for tailored intervention strategies to encourage and promote internet use among infrequent or non-users.

The next final of this report consolidates this information, along with results discussed previously, in an effort to address the final research question: How can the uptake of online behaviours be increased among digitally excluded groups?

## 4. Discussion

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This section includes a detailed discussion of the results presented throughout this report against the primary aims of the study:

- 1) To benchmark digital inclusion in Australia
- 2) To identify, using behavioural profiling, audiences with low access to digital technologies who benefit most from digital inclusion, and
- 3) To develop engagement strategies.

### Digital inclusion in Australia

While the majority of Australians were relatively frequent internet users, there were still a portion who could be considered 'digitally excluded'. Those who never use the internet faced several barriers, from a lack of personal access, to a lack of digital self-efficacy, and in many cases their own negative attitude towards the internet. Even among internet users, some felt their ability to use the internet was inadequate, did not see the benefits of internet use, or were concerned about online privacy. These barriers in turn reduce the likelihood of internet use for everyday behaviours, excluding individuals from many of the benefits the digital environment offers.

As anticipated, digital exclusion follows similar patterns of social exclusion. Those who lack the required access, digital self-efficacy, or who have negative attitudes towards the internet were typically older retired adults, living alone or in regional/remote areas, low income earners with a lower education level, who have a disability or are homeless. In most cases age was the main demographic factor, where an increase in age leads to a decrease in self-efficacy, attitude, and frequency of use. Geographic location, employment status, education, and disability status also tended to make a significant contributions to these variances. That is, individuals were more likely to rate their abilities as 'poor', have a negative attitude, and be an infrequent user if they live outside major cities, are not working, do not have tertiary qualifications, and identify as being disabled.

In addition to the influence of demographic and socio-demographic characteristics on internet use, personality traits also had a weak relationship with frequency of use. Ultimately, the factors which had the greatest influence on use were access and attitude, and, given that many of those who do not have access indicated that they were just 'not interested', addressing issues associated with negative internet attitudes may result in an increased desire to attain access at home.

### Behaviour profiles

Behaviour profiling identified five typologies of internet users. 'Non-users' represent the smallest group (9%), however they are also the most vulnerable group as they are the typically 'digitally excluded'; that is, primarily elderly retirees living alone, many in regional areas, who are less-educated, often disabled, and often on low incomes. 'Samplers' (17%) and 'Socialisers' (18%) represent infrequent users who will engage with the internet on occasion or for a specific purpose, but are not necessarily utilising the practical benefits of the digital environment. They are the 'low hanging fruit' for potential interventions as both groups are not entirely dismissive of the internet, but may lack sufficient ability or motivation to engage further. 'Pragmatics' and 'Enthusiasts' are the younger working class who rely on the internet for most WI tasks. Both groups are comfortable with the internet, and have the required abilities to use the internet when they choose to do so.

Looking at specific online behaviours, there are certain activities which have been embraced by most internet users. All groups (excluding 'Non-users') will use the internet at least 30% of the time to search for general information, and between 18% and 68% of the time to communicate with family

and friends. Shopping is typically the least frequent online behaviour, although it is also one of the few behaviours that is somewhat likely to be taken up on the next 12 months. 'Socialisers' and 'Pragmatics' differ in their use of the internet for SME and WI behaviours.

### Engagement strategies

Given their infrequent (or lack of) engagement with the internet 'Non-users', 'Samplers', and 'Socialisers' may require assistance to improve their level of digital inclusion. 'Non-users' are the most likely group to face the issue of access however, given their significant lack of interest, they may not be receptive to initiatives for encouraging internet use. The majority of 'Non-users' also reported that they had never learned how to use the internet. Taken together, this indicates that training programs for 'Non-users' may be a useful starting point to help introduce those who are interested to the basic skills required to appreciate the benefits of being digitally included.

Unlike 'Non-users', only a small portion of 'Samplers' and 'Socialisers' indicated that they never learned how to use the internet; in most cases they were either self-taught or learned through friends and/or family members. Despite having learned how to use the internet, 'Samplers' and 'Socialisers' were more likely than heavier users to mention the need to increase their skill/knowledge in relation to specific behaviours (e.g. sharing photos or videos). In both cases, their infrequent use was also largely attributed to a lack of interest, although the tendency to rate their own abilities as 'poor' or 'fair' points to possible opportunities to enhance their online capabilities. 'Socialisers' would also be more inclined to use certain online services if they were more user-friendly (e.g. government services, job searching, etc.) indicating possible opportunities to work with service providers to develop user-friendly platforms tailored to particular user-groups.

As the most common initial online behaviours from all user-types were communication and information seeking, these would be reasonable starting points for 'Non-users' who are looking to cross the divide. Alternatively, 'Samplers' (who have taken their first steps) would possibly benefit from slightly more advanced activities such as social networking or entertainment. While 'Socialisers' could be encouraged to move even further along the 'path' toward practical behaviours such as managing finances, or using online services.

### Next steps

With a better understanding of the relationship between digital inclusion and behaviour, along with the associated barriers, the next step is to determine which online behaviours to target in order to reduce digital exclusion among vulnerable groups. In general, any digital inclusion intervention should take into account:

1. The different types of internet users,
2. Common behavioural pathways of internet users, and
3. Behaviour-specific barriers of targeted groups.

In addition, given the influence of attitude, it would be advisable to address internet attitudes in any intervention messaging. For example, working with the generally positive attitudes towards using the internet to look up information about businesses, services, and/or products and using the internet to keep in touch with many people. As priority behaviours will vary according to where individuals sit on their internet journey, and that the barriers associated with priority behaviours will also vary, targeted users should always be involved in the design and testing of specific programs.

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# Appendix 1: Statistical analyses

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## Correlation

Correlation is a statistical tool to measure the extent to which two variables relate to one another. The Pearson correlation coefficient ( $r$ ) indicates the strength of the relationship by identifying a 'line of best fit' between the variables. Relationships can be positive (i.e. as one variable increases the other increases) or negative (i.e. as one variable increases the other decreases), and can range in strength between  $\pm 1$  and 0 where values closer to 0 indicate a weaker relationship strength.

## Factor analysis

Exploratory factor analysis is a tool used to identify underlying concepts or traits (factors) within a larger series of questions. It is useful for measuring concepts which are difficult to measure using a single question or variable. Factor analysis looks for similar patterns of responses to determine their relationship with a latent variable or concept (i.e. not directly measured). For example, in the Digital Inclusion survey, respondents were asked 14 individual questions to measure overall attitude toward the internet. After conducting factor analysis two latent attitude variables were identified – 'Benefits of using the internet' and 'Privacy concerns'.

## Significance testing

References to 'significant differences' signify statistically significant findings at the 95% confidence level ( $p < .05$ ). That is, the finding in question represents a true difference (and not a difference attributed to chance) at the 95% confidence level. Most often, 'significant differences' in this report relate to between-groups variances from t-tests (comparing means) and z-tests (comparing proportions).

## Multiple regression

Multiple regression examines the relationship between several predictor variables (e.g. demographic characteristics) and a dependent variable (e.g. self-efficacy). Specifically, regression analysis helps to understand how scores for the dependent variable change when each predictor variable is varied, while the other predictor variables are 'controlled'.

Hierarchical multiple regression is similar to standard multiple regression however multiple models can be included in a single analysis to compare groups of variables at the same time. For example, a hierarchical regression was conducted to assess the relationship between demographic characteristics and frequency of use (step 1), as well as between non-demographic characteristics (access, skill, & attitude) and frequency of use (step 2). Step 2 of the analysis takes into account (i.e. controls for) the effect of demographic characteristics while also assessing the impact of the non-demographic characteristics. The final model explains 64% of the variance in frequency of use – 27% from Step 1, and 36% from Step 2.

## Cluster analysis

Cluster analysis is an exploratory data analysis tool which aims to sort respondents into groups based on patterns in the data so that the respondents 'fit' together. Cluster analysis can be used to identify structures in data without providing an explanation/interpretation. In other words, cluster analysis simply identifies structures in the data without explaining why they exist.



## Appendix 2: Sample composition by barrier level

Table A.1. Sample composition by access at home or via mobile device

Demographic characteristics		Has access %
Age group	18-44 years	100
	45-64 years	95
	65 years or over	80
Geography	Major Cities	94
	Inner/outer regional	91
	Remote/very remote	91
Household type	Single person household	82
	Single parent/couple without dependent children	93
	Couple with dependent children	99
	Single parent with dependent children	94
	Other household type	98
	No permanent household	100
Personal income	Less than \$400 per week	86
	\$400-\$999 per week	93
	\$1,000-\$1,999 per week	99
	\$2,000 or more per week	100
Employment status	Self-employed or a small business owner	96
	Employed (full time, part time, or casually)	98
	Unemployed	92
	Home duties / student only	100
	Retired	81
Educational qualification	Year 11 or below	84
	Year 12	92
	Certificate or Diploma	97
	Bachelor's degree or higher	98
Cultural & linguistic diversity	Born in Australia	93
	Born overseas	94
	English only at home	93
	Non-English speaker at home	94
	English is first language	93
	English is NOT first language	94
Indigenous	Identifies as indigenous	91
	Does not identify as indigenous	93
Disability	Identifies as having a disability	80
	Does not identify as having a disability	95

Table A.2. Sample comparison by digital self-efficacy

Demographic characteristics		Self-rated ability Mean
<b>Age group</b>	18-44 years	3.90
	45-64 years	3.13
	65 years or over	2.49
<b>Geography</b>	Major Cities	3.38
	Inner/outer regional	3.11
	Remote/very remote	2.79
<b>Household type</b>	Single person household	2.92
	Single parent/couple without dependent children	3.11
	Couple with dependent children	3.56
	Single parent with dependent children	3.48
	Other household type	3.75
	No permanent household	3.75
<b>Personal income</b>	Less than \$400 per week	2.94
	\$400-\$999 per week	3.31
	\$1,000-\$1,999 per week	3.53
	\$2,000 or more per week	3.70
<b>Employment status</b>	Self-employed or a small business owner	3.49
	Employed (full time, part time, or casually)	3.60
	Unemployed	3.26
	Home duties / student only	3.33
	Retired	2.50
<b>Educational qualification</b>	Year 11 or below	2.58
	Year 12	3.23
	Certificate or Diploma	3.41
	Bachelor's degree or higher	3.70
<b>Cultural &amp; linguistic diversity</b>	Born in Australia	3.27
	Born overseas	3.30
	English only at home	3.26
	Non-English speaker at home	3.40
	English is first language	3.27
English is NOT first language	3.37	
<b>Indigenous</b>	Identifies as indigenous	3.11
	Does not identify as indigenous	3.28
<b>Disability</b>	Identifies as having a disability	2.74
	Does not identify as having a disability	3.34

Table A.3. Sample comparison by attitude score

Demographic characteristics		Attitude score Mean
<b>Age group</b>	18-44 years	3.65
	45-64 years	3.29
	65 years or over	2.78
<b>Geography</b>	Major Cities	3.36
	Inner/outer regional	3.22
	Remote/very remote	3.23
<b>Household type</b>	Single person household	3.09
	Single parent/couple without dependent children	3.21
	Couple with dependent children	3.51
	Single parent with dependent children	3.40
	Other household type	3.55
	No permanent household	3.66
<b>Personal income</b>	Less than \$400 per week	3.11
	\$400-\$999 per week	3.34
	\$1,000-\$1,999 per week	3.52
	\$2,000 or more per week	3.63
<b>Employment status</b>	Self-employed or a small business owner	3.38
	Employed (full time, part time, or casually)	3.52
	Unemployed	3.30
	Home duties / student only	3.46
	Retired	2.83
<b>Educational qualification</b>	Year 11 or below	2.97
	Year 12	3.26
	Certificate or Diploma	3.37
	Bachelor's degree or higher	3.54
<b>Cultural &amp; linguistic diversity</b>	Born in Australia	3.32
	Born overseas	3.30
	English only at home	3.31
	Non-English speaker at home	3.35
	English is first language	3.31
English is NOT first language	3.30	
<b>Indigenous</b>	Identifies as indigenous	3.22
	Does not identify as indigenous	3.31
<b>Disability</b>	Identifies as having a disability	2.98
	Does not identify as having a disability	3.35