New Zealanders with disabilities and their Internet use

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About this report

This report presents the findings from a series of interviews conducted with New Zealanders with disabilities who talked about their experiences of Internet use. Rather than classifying myself as a "disability researcher", my approach to this study comes as an Internet researcher interested in people's opinions and attitudes toward the impact of digital technologies on society. In particular, I am interested in exploring the existence of "digital divides"— also referred to as "digital exclusion"—where, for various reasons, certain groups and individuals are marginalised when it comes to open and equal access to, and use of, the Internet.

My interest in what the Internet means to people with disabilities was in fact piqued a number of years ago when I attended the inaugural Nethui Conference organised by InternetNZ in 2011. This multi-stakeholder meeting brought together people representing many sectors in society interested in the use of the rapidly evolving Internet and the development of various new media technologies. One of the discussion sessions I attended was labelled "access and accessibility". My assumption was that this session would be about issues relating to geographic access to the Internet in New Zealand given that public discussion about the roll out of ultra-fast broadband was only just gaining momentum. I was keen to hear different perspectives particularly since I was one of the founding researchers involved in the World Internet Project (WIP), in the New Zealand study which surveyed New Zealanders about their Internet use.[1]

In those days, utopian views about the Internet anticipated the level playing field it would offer people, regardless of who they were or where they lived. I wanted to know more about how New Zealand compared internationally with regard to its Internet access and believed that this session would provide useful information. Needless to say, I learned very quickly that access is not just about copper pipes and fibre networks—it is also about the barriers that limit or prevent Internet access and use to marginalised groups, whether this relates, for example, to age, socioeconomic status, education level, or physical or cognitive abilities.

People with vision and/or hearing impairments and their advocates at this Nethui session highlighted interesting issues regarding what impinged on their Internet use. But I was particularly struck by the comments of a young woman with cerebral palsy. Sitting in a wheelchair and unable to communicate vocally, she conscientiously tapped her head wand on a computer keyboard to relay questions via a support person to the discussant. Her concerns were mainly about the lack of funding for people requiring assistive technology or devices to

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[1] The World Internet Project is a global survey repeated over a number of years that compares Internet use in a number of countries. The survey of New Zealanders has been conducted by Auckland University of Technology every two years since 2007.

enable Internet use. Expense of specialised devices to aid Internet use was just one issue raised for people with disabilities at this session and there were many other stories of both frustration and concern. I came away that day believing that hearing the voices of those who might fall behind in the Internet revolution was important. As a result, I went on to develop contacts within the disability community and I advocated for the inclusion of a question about people with disability in our World Internet Project in New Zealand (WIPNZ) surveys. We found that 16 percent of Internet users in our 2015 WIPNZ survey indicated they had a disability of some sort (Crothers, Smith, Urale, & Bell, 2016). It is my hope that other international partners in the WIP might also include similar questions in their future surveys.

I was fortunate to receive funding from the School of Language and Culture at Auckland University of Technology, and from InternetNZ (a non-profit organisation that aims to promote the Internet's benefits and uses, and protect its potential), to conduct the interviews for this study to gain a better understanding of the Internet's impact on the lives of people with disabilities. It is my intention that this research is emancipatory—not in the sense of liberating people with disabilities, but rather that the findings encourage open and honest discussion about "digital divides" and how these might be overcome. I especially wish to acknowledge two disability consultants, Sacha Dylan of Connectos Consulting and Kevin Prince of Access One in Five, who offered advice and support in the development of this research and were also involved in interviewing participants. Thank you, too, to Jan Rhodes for transcribing the hours of interview tapes, to Professor Allan Bell and Dr Lynn Grant for providing comments on drafts of this report, and to Andrew Lavery of Academic Consulting for formatting the document to meet web accessibility standards. Of course, none of this would have been possible without the involvement of the 11 study participants who were generous with their time in contributing their thoughts and insightful comments about the impact of the Internet on their lives. I am grateful to you for your participation and dedicate this report to you all.

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Executive summary

People with disabilities are no different from most Internet users when it comes to wanting to use digital technology and participate in online activities for purposes such as communication, education and information seeking, entertainment, consumer activities, social networking, advocacy for disability groups and for work.

People with disabilities have as much right as anyone else to use the Internet, but may require assistive devices, specialised software or training to do so.

People with disabilities in this study who were of an age to know what life was like before the advent of the Internet felt the new technology had mostly made a positive impact on their lives. In particular, the Internet offered them greater independence and made them less reliant on others for assistance, particularly in conducting activities previously done offline, such as making purchases or paying bills.

In spite of technological advancement, a disability digital divide still exists. Barriers include the cost of specialised devices and software; the inadequate design of digital devices, software and websites that do not incorporate features to enable universal use; and a lack of adequate training support to improve digital skills or to use devices or software tailored to a person's particular requirements.

A persistent barrier experienced by people with disabilities is the attitude of others who either fail to recognise their needs when it comes to development of Internet–related technologies, or ignore the fact that they have the right to be Internet users.

People with disabilities may choose not to participate in certain online activities such as using the Cloud or doing Internet banking. This may not necessarily be because of their disabilities, but rather for reasons that affect many people in society such as security concerns or simply not wishing to do certain activities.

People with disabilities would like to be treated on a more equal footing as Internet users. This prompts a call for more research in the area of people with disabilities and Internet use, more education to change attitudes towards people with disabilities and their Internet use, and improved consultation between government and organisations with people with disabilities as part of the process in the design and development of ICTs, software and websites.

> "Disability is the process which happens when one group of people create barriers by designing a world only for their way of living, taking no account of the impairments other people have ..."
>
> *The New Zealand Disability Strategy (2001, p.1)*

Introduction

One in four New Zealanders (1.1 million people) identified themselves as being disabled in the last Statistics New Zealand disability survey (2013).[2] This is a relatively significant proportion of the population and, with so many daily activities and services now occurring in online platforms, when it comes to researching the Internet, many questions are raised about the advantages and disadvantages the digital age brings to people with disabilities. To what extent are they included or excluded when it comes to the development and use of new digital technologies, and what areas need to be addressed?

Sixteen years ago, the New Zealand Government, in its disability strategy (2001), made a commitment to eliminate barriers and promote a more inclusive society for disabled people on every level, to ensure that "all government departments and other government agencies consider disabled people before making decisions" (p. iii). (Note: a review of this strategy involving public consultation was underway at the time of publication of this research.) However, it was New Zealand's ratification of the 2006 United Nations Convention on the Rights of Persons with Disabilities where the importance of inclusiveness surrounding the Internet and information and communication technology (ICTs) was highlighted. Article 9, (2) g and h[3] of the convention stated that:

> Parties shall also take appropriate measures:
>
> g) To promote access for persons with disabilities to new information and communications technologies and systems, including the Internet;
>
> h) To promote the design, development, production and distribution of accessible information and communications technologies and systems at an early stage, so that these technologies and systems become accessible at minimum cost.

Certainly, efforts have been made in recent years to address the United Nations articles in New Zealand, particularly with the Government's web standards authority announcing that there was now "a reasonable expectation that the

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[2] Fifty-nine percent of people were aged over 65 years, 21 percent were adults under 65 years, and the remaining 11 percent were children under 15 years.
[3] http://www.un.org/disabilities/convention/conventionfull.shtml

websites of all Government organisations will be accessible to the widest range of New Zealanders, including people with disabilities" (New Zealand Government, 2014). Examples of features that make a website and its content more inclusive are:

- a descriptive text alternative for images, video, and audio, or captions in the case of video with audio

- headings that accurately explain content

- text on a coloured background that is easy to see.[4]

But for people with disabilities in New Zealand, living in the digital age has much wider implications when it comes to their access and accessibility. This report presents the findings from interviews conducted with 11 New Zealanders with a range of disabilities about their Internet use. A description of the study design is outlined in Section One, followed by the presentation of the findings of the research in Section Two. These findings look at firstly, how the participants engage in certain strategies to enable their Internet use in relation to their disability or impairment; secondly, the various online activities they like to participate in; thirdly, the range of barriers they have encountered in their Internet use; and, fourthly, participants' attitudes towards the Internet and how it has impacted on their lives in terms of technology and independence, identity and socialisation. The conclusion in Section Three reflects upon the findings of the research, offers recommendations and makes suggestions for future research.

Section 1: Study design

Eleven New Zealanders with a range of disabilities or impairments were interviewed in this study to understand the impact the Internet has had on their lives. Participants over the age of 45 years were selected because this time span meant they were not born at a time when digital technology existed but rather were able to observe its emergence. In addition, they would be able to reflect on the ways the Internet had affected them personally. People were invited to apply to be participants by advertising word of mouth through various disability networks and in the posting of information on relevant websites (ACCESS blog, for example, http://publicaddress.net/access/). Although 12 participants were originally selected, one had to withdraw in the early stages of the research.

Although the number of participants involved in this study was not large, the main objective was to involve people with differing disabilities in order to get a

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[4] More information on website design can be found at:
https://webtoolkit.govt.nz/guidance/design-and-development/quick-reference-guides/web-accessibility-for-content-editors/

wide perspective on the impact of the Internet that could lead to more comprehensive research in the future. The participants were purposely selected to cover a range of disabilities to understand the different ways difficulties with vision, hearing, speech, mobility, co-ordination or learning affected their Internet use (see Table 1 for a list of participants' self-reported disabilities). Note that for confidentiality purposes, each interview participant is coded with a number and the letters F or M to denote the participant's gender.)

Table 1. List of participants with codes and disability description

Participant code	Self-reported disability
1F	Vision impairment (partially sighted)
2F	Arthritis/mobility issues
3F	Cerebral palsy (speaking difficulties, hearing impairment)
4F	Cerebral palsy (speaking difficulties, wheelchair user)
5F	Hearing/vision/co-ordination(neurological)/mobility
6F	Mobility issues (wheelchair user)
7F	Deaf
1M	Vision impairment
2M	Dual-sensory loss (deafblind)
3M	Blind from birth/hearing impairment
4M	Learning disabilities

There are other aspects to note that indicate that the participants need to be seen as individuals rather than as "representative" of any particular group. Some people were born with an impairment, while others developed a disability part way through their lives. Educational levels varied, with more than half of the participants having tertiary degrees or diplomas, while others had secondary school qualifications or had completed course work through the IHC (an organisation that supports people with intellectual disabilities). Some of the participants were currently in paid employment, while others were seeking employment or did voluntary work.

Information sheets and consent forms were sent to participants in advance of the interviews as part of the AUT University Ethics Committee (AUTEC) requirements. Any identifiable information has been excluded from the report. Indicative questions were provided to the participants ahead of their interviews to allow advance consideration of the topics to be discussed, though interviews were open-ended, enabling participants to go beyond the subject matter if they wished.

The audio-recorded interviews, each ranging between 60 and 90 minutes in length, were conducted with the assistance of two disability consultants either in person with the participants or by telephone, or in one case, via an email exchange with the interviewer. One participant with cerebral palsy had difficulty with vocalisation and opted to use an iPad with a voice synthesiser for the interview. All of the participants reviewed their interview transcripts and made minor corrections prior to analysis and the writing of the report.

Section 2: Findings

2.1 Accessing the Internet

All of the participants in this study had access to the Internet either via desk top computers, mobile phones (smartphones) or devices such as tablets or e-readers. Because their disabilities varied, their Internet use also differed. The following outlines some of the strategies they used.

Vision impairment

This included participants who were blind or whose level of vision limited their ability to read text or see images on the screens of computers or mobile devices. Barriers included inadequate font size and poor colour choice of the text (pale grey text against a pale background in particular was difficult to read). Some people with partial vision either held devices, such as tablets or smartphones, close up to their eyes to read, or adjusted computer settings—for example, to enlarge text, adjust colour contrast, or increase the size of the cursor to enable easier navigation. However, some participants reported that the concentration required to read screens often caused tiredness and eye strain. 5F described navigating some websites as an "absolute nightmare" while 1F described how she dealt with problems of eye focus:

> "I find I have trouble maintaining my focus on a long line of text. So I notice a lot of people use their iPads landscape whereas I use mine portrait because it's got shorter lines."

Some of the assistive technologies used by people with vision impairment included:

- screen reading software such as JAWS (Job Access with Speech) that reads out on-screen text through a voice synthesiser

- a standalone device such as a scanner that scans text and reads it aloud

- Internet-enabled book readers

- an app on a smartphone or tablet called KNFB that enables the camera to take pictures of printed material, converts them into text and reads the text aloud

- software such as "Magic" that enables users to customise aspects of the screen visually, such as changing the text to white with a black background allowing for simpler magnification and reducing the strain on the eyes

- a braille keyboard to type text such as emails or to post comments.

- audio content or podcasts presented opportunities for participants with vision impairment to obtain information as long as these were easy to locate on a website.

Hearing impairment

Participants ranged from people with total deafness to those who had hearing difficulties to the extent that their Internet use was reliant on their visual capabilities. Text messaging and video conferencing were important communication tools. Although the Skype app involved visual communication,7F said it was often impossible to lip read a hearing person as the lip movements were often out of synchronisation with the sound that came through. The chat function of Skype or Facebook (that is, real-time chat or synchronous communication) offered a suitable alternative because more than one person could be involved at a time. 7F said Skyping this way was useful particularly for her work when she needed to communicate with others who were widespread geographically. New Zealand Sign Language was considered a valuable option when communicating via the Internet, as long as the broadband speed was stable and fast enough. Viewing video clips, movies or television programmes was regarded as problematic for people with hearing impairments unless sub-titled or with an online Sign Language component included. As 7F commented: "Now we can access videos online in Sign Language too which is fantastic." 7F also noted that captions were appearing more often as part of online movies and videos such as Ted Talks. Some podcasts, which only have audio content, also had transcripts available to access which were useful. 7F found that reading the news online at any time of day was "awesome" for her because it reduced her reliance on hearing people to pass on information and she did not have to wait for either the publication of the daily hard copy newspaper, or for the broadcast of television news (parts of which were captioned for the hearing impaired). In summing up the advantage of being able to access information from a variety of sources online, 7F commented: "I am informed at a more equitable rate compared to the past."

Mobility, fine motor skills and vocalisation

Mobility, fine motor skills and vocalisation issues were some of the difficulties experienced by participants with cerebral palsy, participants in wheelchairs, or those who found the physical act of using a computer or a mobile device difficult. A lack of agility with their hands to use a keyboard or operate devices, or experiencing discomfort and tiredness after sitting for long periods of time at a computer affected the ways people used the Internet. 2F described the effects of her arthritis:

"The amount of time I want to spend online is not conducive to the

wellbeing of my hands. I get a lot of pain in my hands. I've had a lot of problems with using the computer…. my hands, neck, back, everything, every area of the body that I've got problems in are exacerbated by that and I know that I shouldn't sit for too long."

For 3F, studying online was made easier for her if electronic books (e-books) were available through the library. She was also able to scan sections of her textbooks to send to her designated "writer" (a person who would write up study notes for her) who lived in a different city.

There were a number of devices that participants who experienced difficulties with fine motor skills employed in using the desk top computer. 2F used an ergonomically designed split keyboard which helped her because of her arthritis, while 3F, who has cerebral palsy, used a glide point (mouse alternative). 6F preferred using a gel-padded wrist rest a friend sent her from overseas which she found "brilliant", though the arthritis in her thumb restricted the amount of time she could spend online to about two hours per day. Touch-sensitive devices were also an issue for some participants. One participant with fine motor co-ordination difficulties was unable to use the touch-screen interface effectively. 2F lacked feeling in her fingertips which meant that using devices reliant on touch, such as a smartphone or tablet, was difficult and this prevented her from using apps. Two of the participants with cerebral palsy had speaking difficulties, but found communicating via email or other text-based forums an advantage. 4F typed words into her tablet which were then "read out" by a voice synthesiser. This was a most effective way for her to communicate with others.

In spite of the difficulties experienced with Internet use, many participants found that the ability to conduct certain activities from home or work, rather than travelling to a location, was a great advantage for them. Therefore, purchasing products online, using Internet banking or making travel bookings via the computer were much more efficient than having to physically travel to a destination to make these arrangements. 2F had arthritis so found it difficult to walk around shops or carry heavy bags. For this reason, shopping online and having items delivered to her home had been of immense help. 6F, who had mobility issues and used crutches, looked up the virtual maps on Google Earth to check a location's accessibility and parking availability, or to look at pedestrian access. She also used the Internet to plan overseas trips and made inquiries via email as to whether she could use her NZ disabled parking permit in other countries.

Learning and cognition

Learning and cognition was an issue for 4M who had learning difficulties. However, he had completed educational courses through the IHC. 4M estimated that he spent between three and four hours on the Internet every day, using it for

activities such as budgeting, checking his income and outgoings online; paying rates; making travel arrangements; and listening to music. He also enjoyed using social networking sites and found the Internet useful for accessing easy-read material. 4M was an active participant in a range of disability committees and organisations and found that the Internet was ideal for communicating with others for this purpose. In particular, he was able to receive documents via the Internet in advance of meetings as well as newsletters. He used an iPad to store documents he required when attending meetings, but also used it for writing emails. Assistance from a designated helper guided 4M in some of his work-related Internet activities, but his family also helped him when it came to understanding documents. One of his observations about the Internet was that he felt that some information on websites was not written in "plain English" for everyone to understand.

Multiple impairments

Participants with more than one disability (see Table 1) faced more complicated use of the Internet, but demonstrated resourcefulness. 2M, for example, who is both deaf and blind, used ICOM, a Bluetooth connection on his smartphone that was linked to his hearing aid. He also used voice-activated texting to communicate with others. 3M, also blind and with a hearing impairment, used multiple devices in his everyday life, whether voice activation on his phone to dictate tweets or messages, apps to email files in a variety of formats, Internet-enabled book readers, or a navigation app in braille on his smartphone. While in some cases the Internet use of participants with multiple impairments was more complicated and often frustrating, they were still committed to getting the best access and accessibility possible.

2.2   Online activities

Most of the participants indicated that they used the Internet on a daily basis—though some people said they limited their hours because of tiredness or physical weakness. This section outlines the types of Internet activities the participants engaged in—that is, communication, consumer activities, education and information seeking, entertainment, social media, advocacy and work. These activities were accomplished using a range of devices such as desk top computers, laptops, mobile phones (smartphones), or tablets.

Communication

All of the participants used the Internet for communication purposes whether this related to work or for personal reasons. Activities included emailing, Skyping, and social networking. The following comment from 2M about his smartphone is indicative that, like many of us, he was inseparable from this form of communication:

> "It's what I rely on every day now for my news and contacts and my own phone I actually carry it around with me because of its good use."

Consumer activities

Online banking, purchasing items, doing their accounts, and paying bills were common activities for a lot of the participants. 6F's rather enthusiastic comment conveys the extent to which such activities can be accomplished:

> "I have bought stationery and books, software upgrades, a carpet. And a house! I really did buy a house without seeing it except on the Internet. And I was in Australia when the estate agent emailed me to say I had bought it."

3F also enjoyed the ease with which she could now make purchases and payments using online platforms:

> "It's very easy to put stuff in the shopping cart and to pay through Internet banking. The other thing I love is the Internet banking. That's been a great help because I have to pay my carers and stuff like that. It's just brilliant."

Education, information seeking and work

Several participants used the Internet for study or doing online courses. For example, 3F was studying for a degree by correspondence, while 4F hoped that her completion of an online community computer programming course would open doors for her to become employed. 1F used an app to access the library catalogue and check her account. 5F was keen on online genealogy. For those participants who were employed, the Internet provided a range of opportunities. 5F found using Dropbox "quite useful" to do work collaboratively on strategic planning documents which would often go through numerous revisions, and she remarked that writing submissions online for work had improved her life because it was much easier than previously when she had to type them up, make copies and send them by post. 4M found email extremely useful for receiving documents in advance of committee meetings as well as for communication and making arrangements with others.

Entertainment

Downloading music, watching video or films, writing their own blogs, and playing games online were popular entertainment activities for some participants. 3F did not have a television set but watched programmes, particularly the news, on the Internet instead. 1F delighted in the digital music service Spotify remarking: "I am finding music that I haven't heard for years and I just love them. Great fun", while 1M enjoyed using iPlayer and Netflix for entertainment. 3M enjoyed playing RS

games with their special platform that is deliberately designed for the blind and gives speech feedback rather than visual information.

Social networking

Social networking platforms such as Facebook and Twitter were used by some of the participants, but not all. While some participants used social media for work purposes or to keep in touch with friends and family, others developed new friendships both locally and overseas.

Advocacy

The Internet offered participants opportunities to advocate for people with disabilities, for example, making submissions on disability related topics, organising community activities, emailing organisations or advising the Government about how to improve the accessibility of its websites. One participant had no hesitation in contacting organisations via the Internet to tell them how they could improve the language they used when writing about or describing disability communities.

2.3 Barriers

Although all of the participants indicated the positive impact of the Internet on their lives—particularly when it came to communicating with others—it was clear that they still experienced digital divides. The following sections outline those barriers that the participants identified as affecting their Internet use.

2.3.1 Accessibility through website and software design

A number of the participants with vision impairment were frustrated with some aspects of the Internet such as PDF documents which were commonly used on websites. The PDF ("portable document format") programme, developed by Adobe, enables documents from any application to be converted to a format which retains the original appearance/layout/print quality and can limit the copying of text, graphics, changes and printing. The advantage is that these documents can be easily downloaded; however, there are issues for people who use a screen reader as it cannot easily recognise or describe PDF text. Although Adobe has introduced instructions for people to create PDF documents that meet common accessibility standards,[5] the quality of some of these documents can vary greatly. People with low vision and cognitive impairments, for example, are often unable to change fonts or colours chosen by the author. 5F described PDFs as "one of the greatest online impediments in my life" and she criticised some government departments for uploading documents that failed to meet Web

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[5] Adobe has introduced instructions for people to create PDF documents that meet common accessibility standards (Web Content Accessibility Guidelines (WCAG) 2.0 and PDF/UA (Universal Access, or ISO 14289).

accessibility standards. She also said that she refused to forward such PDFs or send the links to others:

> "Why on earth would I pass on a PDF only, knowing that if I did so I'd be excluding some people?"

3F felt that organisations should give more thought to how they transferred hard copy documents onto a website. Formats such as two columns of text were not always easy for people with low vision to access nor for those with dyslexia or cognitive difficulties who had problems navigating websites.

The CAPTCHA[6] feature on websites was also regarded as a "nightmare" for some participants. This software programme, used on some websites, requests a person to read and type visually distorted words into a box to prove that they are human and not a robot, in order to avoid spam or abusive scripts. While the intention of CAPTCHA is to benefit Internet users, the distorted words are difficult for people with vision impairments to read, or for screen readers to interpret. This proved frustrating for some participants who after spending a great deal of time filling in an online form, or wishing to submit a file, discovered that they could not proceed past the CAPTCHA feature. An audio alternative of CAPTCHA was sometimes available but 1M said it was not always easy to hear the letters being read out. Delays in trying to work out the CAPTCHA code often meant users were "timed out" by the website because they were unable to input the information fast enough and were faced with having to start over again. On one occasion, a person who was blind tried 10 times without success to get the audio CAPTCHA to work and this was in spite of assistance from a sighted colleague. As 1M commented to highlight his frustration:

> "It would be the equivalent for somebody using a wheelchair and being able to get in and do the shopping, but they find that the actual payment till is on the next floor and it's got no lift getting up there!"

Other issues raised by participants included voice-activated systems not working properly, screen readers such as JAWS not operating on an e-reader, and the lack of captions for some online television programmes. One problem encountered by 1F was white font on a black background for Spotify on her iPad, which was difficult visually because of her partial sight. While 5F liked to use the Internet for researching family history, she found various genealogy websites had incompatible file formats which made accessing them difficult and there was a lack of description available for photographs. Online genealogy, she said, could "cause one to grind one's teeth an awful lot".

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[6] CAPTCHA is the acronym for "Completely Automated Public Turing test to tell Computers and Humans Apart"

1M, who is blind, was philosophical that the Internet could not become totally user friendly when so many people posted pictures online for personal reasons. However, important activities were a different matter:

> "If someone wants to say, 'Look this is a photo of me on holiday', that's their right to do that … It's where something is a requirement that you need it to be expressed [online] in multimodal ways if you like. So filling out your tax forms, filling out your census, doing your shopping, whatever it happens to be."

2.3.2 Assistive devices, skills and digital literacy

The expense of purchasing assistive technology devices or software (such as a screen reader) on top of buying mainstream products like a computer or smartphone, plus the cost of training in their use, were barriers for a number of the participants. 1M regarded the costs incurred to enable access and accessibility was like a "tax on being disabled" which he described as "massive". He went on to give the following example:

> "Our biggest tyranny for many years was we had to buy a computer but then we had to buy a really expensive lot of software that was probably costing more than the computer ever cost to be able to access the computer in the first place."

However, it was noted that some manufacturers were beginning to acknowledge what they could do for people with disabilities and were incorporating features into devices, such as screen readers in Apple devices.

At least five of the participants indicated frustration with their own lack of Internet skills as well as an absence of support for ongoing training, particularly in using specialised devices or software. The fact that the respondents in this study were aged 45 years and over meant that their familiarity with digital technologies did not come instinctively as might be the case with "digital natives" (those people who are born in the digital age). All of the respondents were faced with learning a new way of thinking and doing when it came to digital devices and services. Several participants stated that they had struggled to teach themselves. Success often resulted through patience involving trial and error which could be extremely time-consuming. An inability to get to grips with the technology left some with feelings of inadequacy. 1F stated that at times she felt "hopeless", used the word "complicated" on several occasions when referring to her use of technology and commented:

> "I have just had to learn by trial and error. Consequently my ability to use Word really well is not good and I am not good at PowerPoint either. I have to get assistance. Fortunately my daughter is a whizz on all of that stuff."

2F referred to her own "technological backwardness" as a reason for not making more use of the facilities on her mobile phone, while 2M indicated his vexation when encountering a technological problem:

> "I really try hard, but I try too hard and really get too frustrated to complete the whole thing, and give up."

1F commented on the effect of a lack of digital literacy:

> "I am not a digital native, so I do find that I've got to get used to things and I tend to panic a bit, especially if it's a very busy screen and things threaten to time out, I don't like it."

Self-worth and confidence were important for participants who regarded themselves at a disadvantage because of their lack of skills. But as 2M reflected:

> "You've got to feel good about yourself before you can start learning."

Some participants relied on assistance from family members to do some tasks, though they disliked having to ask for their help. Even though some of the participants received work or government-funded training in using digital technology, they felt that the level of support was sometimes inadequate.

2M said that he was "lucky" to have a technological expert come to his home on a weekly basis. However, experts often had to spend time understanding a person's disability which could be time-consuming and impact on the overall amount of support received.

1F said that training was available at her work, however it was not set for her particular needs and this presented a problem:

> "People buy you software and they plonk it on the computer and they say here you go and that's it … if you are still struggling to learn to use the computer and nobody has set it up properly for you it's really hard."

Although respondents had issues with skills and digital literacy, persevering in becoming competent Internet users was seen to be a worthwhile pursuit. An advocate for people with disabilities, 1M felt that although people did not know how to use technology, or thought they were too old to learn, it was important to encourage them to take up online skills training. In indicating the advantages of being digitally literate, he commented:

> "The more and more people that get online the easier it is for us to reach them instantly or relatively instantly. So we are trying to encourage more and more people to take up online skills training because sometimes they've got the equipment but they don't know how to use it, because becoming a confident user meant you could get

around many design problems that were encountered."

This perspective was echoed by 2M who said that he became more confident in making inquiries about new technologies and that:

"it really excites me if I hear or see something that's come out for my benefit."

2.3.3 The attitudes of others

1. Technology, software developers and website designers

One of the biggest barriers to emerge from the interviews in this study was the lack of acknowledgment and understanding by others that people with disabilities were not only capable of using the Internet in most situations, with support where needed, but that they also had a right to use it. This attitudinal barrier, according to 5F, focused on people with disabilities as if they were one group. She commented:

"At a collective level [there are] expectations that disabled people either won't participate or are invisible, don't count, don't matter."

This was felt to be particularly relevant with regard to the designers and developers of websites, digital devices and software. People with disabilities felt that they were often "invisible" to those designing the technology and creating websites—particularly in setting up systems. The attitude of some, according to 1M, was evident in their questions such as: "Why would you want to use our website anyway? You're blind, why are you interested in movies?" Some organisations, he said, had assumptions that people with vision impairment simply could not use an "ordinary" website. Rather than incorporating web standards to make it accessible for them (such as including an audible graphics description), a text-only version of the website was offered which lacked important features and was often not kept up to date. As 3M pointed out:

"The biggest negative of all to my view is that the Internet has largely been driven by commercial considerations rather than innovation."

Comments from the participants indicated that they clearly felt a sense of "us and them" in that people without disabilities saw them as less capable, did not treat them equally and, in particular, felt no responsibility to consider issues associated with their access to technology. While participants appreciated the efforts made by those who helped them with training or advice, some felt that they were patronised by others and sensed a lack of acknowledgment of the need to provide access to the Internet for all people. A feeling of digital exclusion was apparent, as demonstrated by 5F's comment:

"It has been immensely difficult because of the way the systems have been set up to make life difficult, to exclude me and to cause me to tear my hair out … And it's not just me … Others in my community … are having immense difficulties."

2M said that, realistically, Internet advisors should think about people with disabilities as individuals and what was best for each of them, rather than treating them as one group. This sentiment was echoed by 3F, who stated:

"There are definitely organisations or whatever that need to rethink about how they put documents on their websites so that everything is accessible."

There was still a feeling amongst participants that both the government and industry could do more to help, particularly in making the Internet accessible for all. 4F said she would like to see more support in the provision of a range of devices for people with disabilities as well as training for them.

Involvement of people with disabilities in an advisory capacity was considered a key component in improving Internet access and accessibility. The participants sought recognition for what they could contribute rather than being dismissed as being "incapable" or having their suggestions repeatedly ignored. They felt that opportunities were being missed and they suggested that they could assist government and industry during the design and creative process by providing information about what was required and what might work, looking towards regulation or identification of standards or protocols. This would be better than attempting to adapt technology at a later date to try and compensate for failures in making the technology accessible and usable by people with disabilities. 5F believed people with disabilities had a lot to offer by being involved:

"I don't think there is anything wrong per se with using non-disabled people. But I think you get value-added when you use disabled people."

As an example, 5F suggested that if a website developer wanted to know how a person with dyslexia might cope with a particular website, then "the best person to tell you, to really test it, is somebody with dyslexia … It would be nice if [government and industry] would look at us…[and] say, 'Disabled people have got knowledge, they do know what works, let's include them'."

2. In the community and at work

The "us versus them" attitudes about people with disabilities and their Internet use were also experienced by participants in the workplace and in the wider community. This had an impact in two different ways. Firstly, people often regarded those with disabilities as being incapable of using the Internet and

therefore believed they lived in a non-online world. Secondly, some people did not regard that a person was "impaired enough" to receive extra assistance such as IT training. 2F noted that people with arthritis often had more of a hidden disability so people did not really understand their issues. 1F also found a reluctance for her work organisation to take on search engine software that would be easier for her to use because the IT department did not support it. Her concerted effort to "fight" for its installation was also motivated by the fact that she wanted to stand up for others as well:

> "If I couldn't get it as a senior person, how would a new person starting at the beginning of their career ever get it? ... The expectation is that I will just have to survive on my own. It's always been that."

A couple of participants had worked as IT specialists either in the setting up of devices or in training, which 1M commented often resulted in a "double-take" from customers because of assumptions that people with disabilities were not capable of such work. However, such experiences actually challenged people's assumptions about people with disabilities and their use of new technologies.

Other participants felt that more organisations needed to think about how they could be more inclusive with the services they offered and how the Internet could enhance the experiences of their customers who have a disability. 1F, for example, said that for people with vision impairment, receiving a theatre programme by email in advance of attending a production, or being handed an iPad at a museum that gave a voice description of an exhibit, would be beneficial.

6F described a different type of issue that can arise with the Internet when people's lack of understanding about the disabled in offline environments transfers online. This related to the repercussions of receiving misleading information about disabled facilities on hotel websites. In arranging accommodation for a trip to England, she found:

> "It is quite legal to advertise your hotel room as being a disabled room when the shower is over the bath. And all they've done is stick a rail beside the toilet."

Because of her difficulties with mobility, 6F was therefore left to bathe out of a bucket rather than use the shower or bath. The hotel chain refused to take responsibility for their misinformation about offering disabled facilities which she found infuriating. As a result, 6F posted a comment on a British newspaper's website about this situation, but the online discussion was closed down because of some of the nasty comments by some readers in response to her post. So, while the Internet can be seen as a tool for advocacy for people with disabilities, it also reveals a more negative side when it comes to the attitudes of others that can appear online.

2.4   Participants' attitudes

This final section is concerned with the participants' own attitudes to how their lives have changed since the advent of the Internet. It highlights their thoughts and views firstly on the technology and secondly on their own identities, enabling a greater understanding of how the digital age has impacted on their lives.

2.4.1 Technology and independence

The participants were able to identify substantial changes in their lives because of the Internet, particularly because they were of an age where they could reflect on what life was like for them before such technologies became available, and what life was like now. Formerly, going shopping or doing bank transactions often meant people with disabilities were reliant on assistance from others for transport and conducting tasks. Taking control of their own requirements by conducting activities via the Internet instilled a sense of independence and empowerment. As 7F commented: "Being able to access information independently is important for me." The participants appreciated it when their software came with ready-made systems included. 1F described VoiceOver – (Apple's built-in screen reader) as "terrific", stating, "I don't have to do anything extra to get that which is great."

Overall, the participants' response to the Internet age was that it was revolutionary to the extent that it was labelled as being "life changing" and "hugely positive". 1F said: "I've been using the Internet for 20 years now. It's amazing", while 1M described the Internet as "the Gutenberg moment" for the blind community because the impact of the technology made some everyday tasks that much easier. This included accessing information independently, such as the news or sports results, rather than relying on others to find the details for them and read them out; planning a journey to an event; or widening one's network of friends. He went on to explain that he had been quick to take advantage of what the Internet had to offer. 4M found the layers of information available, such as audio description and provision of transcripts, gave him a deeper experience which was "exciting". 2M, too, related the effect that the technology had had on his life particularly when changing from a more physical job to a desk job because of deterioration with his eyesight:

> "It made a huge impact on how I felt and how I present myself because I knew this was the only way it was going to help me stay and be part of this world, to keep up with it."

It is also important to note that some participants chose not to engage in some Internet activities, but this was not because of their disabilities, but rather because they were not interested or had concerns over issues such as

cybersecurity. For example, in discussing the Cloud for sharing documents, 5F commented:

> "I tend to be very suspicious of them because they are based offsite. I have concerns about privacy and so I tend not to use overseas storage."

3M found the Internet offered a greater variety of sources of information and entertainment. Prior to the Internet, there was limited access to text through braille and, as there was not much else, he often resorted to reading braille text such as the National Hockey Schedule "from cover to cover ... just because it was there". Much had changed with the Internet in what was available because before it became accessible, everything was localised to what was in your community:

> "Even in areas such as music before Internet the only place you could find music was at the local shop and the local shop may have catered to the taste but if it didn't then what you could get was obviously limited."

For 1M, accessing information on the Internet now meant "you've got choices about where you go on holiday, you've got choices about what newspapers you read, you've got choices about how you travel".

Reflecting on what life would be like without the Internet, 2F said it would be a "lot less rich" because her access to information and activities would be limited. Time was also an important factor in her daily life and she liked the fact that:

> "The Internet speeds things up to some degree."

5F acknowledged the difficulties she has had in using the Internet but at the same time commented: "It's enabled me to communicate, to live, to learn." 6F commented that the Internet had "opened life up tremendously especially since I got broadband".

2.4.2 Identity

When questioned about whether the Internet had altered their identity at all when it came to their disability, the participants offered a range of responses. Most regarded their disability as irrelevant when it came to the activities they pursued online and they felt that, as a result of this, they were treated more equitably by others. 7F, for example, said:

> "When people don't know I am Deaf it feels a lot more 'equal' as the relationship has been established before people realise what is going on."

3F related that because of her speech impediment people often assumed that she was drunk or had an intellectual impairment. However, communicating via the Internet bypassed that judgemental situation for her, as she elaborated:

> "Unless I declare I have an impairment people are oblivious because they can't hear my voice, they can't see my funny little movements, so it gives you a bit of anonymity, which is great."

2M also preferred not to divulge information about being deafblind because it changed the way people responded to him:

> "If you tell them you're deafblind they sometimes get a wee bit too simple for me and it sort of annoys me … I try to work my way around that."

1F too said she conveyed a difference in tone, subject and context when communicating online, whether this was contributing information to a disability site or talking about family or books on her own personal site:

> "It is all about context and you modify your tone for the context."

1M commented that, compared with face-to-face communication, Internet platforms offered an advantage in that not having to respond in real time allowed people time to process their thoughts and comments. In addition, communicating online with people you had not met before could mitigate the social isolation some people with disabilities had experienced in face-to-face situations because their disability or impairment was neither obvious nor relevant. 2F said she only disclosed her disability online if it became an issue as she wished to avoid being labelled as "disabled":

> "Most of the people who I talk to online have no idea about my disability."

A number of participants, however, actively used the Internet to advocate for people with disabilities. 3F, who said she was very social both online and offline, had no hesitation in sending an email to a website pointing out that the words around impairment were "wrong" and should be rewritten. 7F said she needed to have a greater social media presence because her career in the "disability area" meant it was expected:

> "I need to be more visible and to take the opportunity to project the messages and voices of disabled people. Doing it online is good as it is the same means [of communication] many others use."

2.4.3 Socialisation

The effects of the Internet on participants' socialisation varied. 4F related that her cerebral palsy meant that she spent a great deal of her time at home. However, the increased communication she had now with others via the Internet meant that she did not feel isolated. Using social media had widened her online networks and support groups within the community and made her feel more "connected".

4M too found life was pretty lonely before the Internet. Now, he said, he spent less time watching television and more time on the Internet and in contact with others.

While 3M, however, appreciated what the Internet had to offer from a community perspective, it also affected older forms of technology. As an avid member of the "ham" radio world that uses Morse code, 3M noted that the relationships he had built up with this particular circle of people had lessened, mainly because not so many people were familiar with Morse code and, for him, linking the radio to a computer with braille display had become increasingly difficult and expensive. Social media for 3M was an option for socialisation, but was problematic at times as he found it difficult to locate shared access buttons on websites:

> "I had something yesterday that I wanted to share and I just couldn't find a way to do it. I couldn't get the URL to be sure that I had all of it. … it's all about accessibility. It's not about my willingness or the time that I have to spend."

Enhancing relationships through social media was important to many participants. 1F, who is partially blind, said her degree of connectedness was much higher than previously. She was on three social media platforms— Facebook (FB), Twitter and LinkedIn—and noted that:

> "The ability to stay in touch. The ability to read and access information is huge."

1F said she used FB for both business and other groups. While she believed she often wasted time on social media, if she had been away and had no access she missed it. In fact, she "felt funny without it". 2F spends more time on Skype than on her landline phone and this has increased her connectedness with people overseas. For 1M, not only did the Internet make him more competitive in his workplace, he was also pleased to increase his social contact with other people, whether they were blind or not. As he commented:

> "It had made me much more connected outside work both with other blind people but also non-blind people. It has certainly widened my network of friends and contacts and that is true for a lot of blind

people."

1M also enjoyed using Twitter because it enabled him to share information with others:

> "I guess baked into my DNA is a wish to share things and say this is what I found useful, you might find it useful too, but the fact that you can just hit the retweet button makes it much easier to do that."

5F found the Internet useful for maintaining contact with colleagues she had trained with overseas. While 6F too said that she had made lots of overseas connections via the Internet and had had people come to stay with her, she felt that it could still have an isolating effect at times. 6F is more home-bound because she uses the Internet for work and most of her contact with others is by email. The decreased opportunity for client meetings face-to-face led to feelings of isolation for her as she considered herself a social person and used to enjoy being in the office and working with others around her.

1F enjoyed the social aspect of the Internet in that it brought her closer to friends and family locally and internationally. But, at the same time, she saw a positive side to being able to do online activities in isolation. She preferred to use an app to look at a library catalogue rather than using the library PCs, stating:

> "I don't like doing it in public where I am slow. I prefer to do it in private."

Section 3: Discussion and conclusions

This study has focused on interviews conducted with 11 Internet users living in New Zealand who have some form of disability or impairment. The common denominator in the selection of these men and women was that they were aged 45 years or older, as this enabled them to offer a personal perspective on what life was like both before and after the advent of the Internet. In other words, given concerns about disability digital divides, it was important to determine the impact of the Internet on their lives, and what strategies they engaged with to overcome barriers.

The findings showed that the desire of the participants to be part of the digital community is clearly no different from anyone else who wants to use the Internet as part of their daily life. Participants lauded the Internet as "revolutionary" in enabling their access to information or conducting activities by way of a range of devices including desk top computers, iPads or mobile phones. A number of them already used the Internet as part of their employment, but there were also others who hoped becoming more digitally literate would lead to employment opportunities for them. There was a strong indication by the participants that the Internet had given them a greater sense of independence and they were appreciative of being less reliant on others for help in carrying out everyday activities. The participants' narratives indicated how resourceful and Internet-savvy they were when it came to activities such as online banking, emailing and Skyping friends and family, organising travel arrangements, reading the news and books, or looking for information online—all common daily activities that many Internet users take for granted. At the same time, it was clear that disabled people sometimes purposely avoided using the Internet for certain activities—not because of any barrier associated with disabilities, but based on similar concerns within society such as privacy issues or a mistrust of online commerce.

However, this study aimed to delve much deeper in its investigation, in order to understand that many online activities the participants were involved in were not accomplished without challenges and that Internet access and accessibility might not be straightforward for everyone.

Participants were purposively selected for this research to encompass a variety of disabilities, ranging from issues with vision, hearing, and fine motor skill co-ordination, to difficulties with mobility, or learning and socialisation. Generalisations, of course, cannot be based on a relatively small group of participants—but that was not the intention of this research. Each participant was viewed as an individual with their own unique situation regarding Internet use which they were willing to share. The objective of this research, therefore, was to create a greater awareness about the numerous people in society with disabilities who are quite capable of using the Internet. But it also sought to

highlight that, while there are benefits to be gained from being Internet users, the access and accessibility of the Internet for people with a disability may be impeded, or require extra effort, for a variety of reasons. As researchers Katie Ellis and Mike Kent from Curtin University's Department of Internet Studies in Perth, Australia (2011, p81) commented: "The social model of disability (re)defines disability as society's unwillingness to meet the needs of people who have impairments". This raises questions about the obstacles that stand in the way for people with disabilities when it comes to how they use the Internet. How can society ensure equal opportunity for all people regardless of their circumstances?

What emerged from the interviews, and is described in this report, is that while the Internet has been life-changing for many of the participants, there are still many barriers they encounter in their use of it. Examples of these barriers included difficulties in physically using devices, insufficient training in technology use, or ICT developers failing to consider what facilities or features they might incorporate into devices, websites or software to make it easier for people with disabilities to use. But perhaps the most significant barrier that came to light for me as an Internet researcher was the attitude of others towards people with disabilities and their Internet use. Participants often felt that they were invisible, or simply discounted by others who wrongly assumed that they were unable to use the Internet.

Issues with people's attitudes towards those with disabilities are also not new and the Ministry of Social Development's five-year "Think Differently" campaign that ran through until mid-2015 sought to change the negative ways in which people viewed disability. Some of the interview participants had noticed changes occurring, as 7F observed: "Many developers [were] becoming more aware of the need to be fully accessible for all people." However, as this research has shown, attitudes about people with disabilities and their Internet use is a very specific area requiring attention. Hopefully, this can be addressed in the latest disability strategy review.

This report serves as a reminder that disability should not be seen as an individualised health problem, but rather a social process created through "the interaction between how the world functions and people function" (Dylan, 2014). Acknowledging this perspective enables a greater understanding of the need to recognise the rights of people with disabilities and the need to aim for universal accessibility when it comes to the design and development of all things digital. Knowing what the barriers are—physical or otherwise—and seeking to remove them are key to narrowing the disability digital divide.

Many believe that more can be done by government and organisations to address "digital disability" (Goggin & Newell, 2003) and, in particular, the marginalisation or exclusion of people with disabilities when it comes to the

Internet and ICT development. A level playing field is still being sought with regard to Internet access and this needs to be part of a national "conversation". Paul Jaeger, Professor at the College of Information Studies, University of Maryland in the United States, commented that framing accessibility as "an issue of equality, of human rights and social justice may offer a better way to promote tangible changes in attitudes toward and implementations of online accessibility" (Jaeger, 2015, p. 5). Bearing this perspective in mind when reviewing the findings of this report leads me to make the following recommendations that there needs to be:

- Greater consultation with people with disabilities in the design and development of software, devices and websites

- More thought given by designers and developers about the needs of people with disabilities *during* the process and not as an afterthought

- Improved training for IT design, development and procurement professionals to enhance the Internet experience of people with disabilities

- Greater public education and awareness about people with disabilities and their Internet use to change societal assumptions and attitudes towards them

- More research to not only gain a better understanding of disability digital divides, but to give a greater voice to people with disabilities about the impact of the Internet on their lives.

It is my hope that this research will inspire others and lead to many different avenues of investigation. Further research might involve studies of particular groups, whether this relates to a focus on a particular disability or impairment, or looks at younger people with disabilities who have been born in the digital age, or surveys ICT developers about their attitude to digital divides and their solutions regarding making their devices more inclusive.

The final words of this report are from one of the research participants to highlight the potential change that the Internet may bring for people with disabilities. In reflecting on the impact of the Internet on society as a whole and how the Internet era might narrow the disability digital divide in the interests of equality, 1M commented:

"I think [the Internet] is making us more alike in some ways and that has all sorts of interesting implications for disability down the track."

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