Social connectedness of older people in residential aged care communities: The use of internet-based technologies

Preliminary findings

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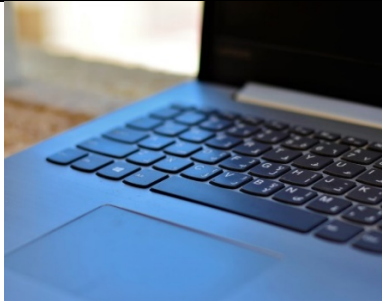Auckland University of Technology

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CONTENTS

EXECUTIVE SUMMARY

The proportion of older people using the internet is greater than ever before; yet, despite this, many people have never been online. Older adults, comprising a population segment vulnerable to social isolation during the late life stages, are more likely to be excluded from the benefits of internet-based technologies and are at risk of being left behind, as more services and information move to digital technologies. A group that is particularly vulnerable to being excluded are those living in aged care environments. While digital engagement in later life is not always desirable or possible, for many people access to online resources may enhance their quality of life through improved access to information and enriched social interactions.

This report outlines preliminary findings from the Social Connectedness of Older People In Residential Aged Care study. The aim of the study was to look at how internet-based technologies are impacting on the maintenance and development of aged care residents' social connections and interactions, and any shortcomings in availability of internet access or other barriers which need to be addressed.

During 2017-2018 we conducted telephone interviews with over 70 people from the community who had a family member or friend living in a residential aged care context, and we conducted face-to-face interviews with 15 residents of a retirement village.

Our research highlighted the enthusiasm with which many older people have adopted digital technologies. Our interviews with community participants, however, also gave us insights into the challenges older people face as they age and the impact this has on their willingness and ability to embrace new technology.

Family members were shown to be incredibly important in bridging the knowledge gap for the inexperienced older technology user. Without family input, many older people would be technologically excluded. Residential aged care operators currently appear to be relatively divorced from ensuring residents' online social opportunities are maximised, although family members were keen for aged care facilities to become involved and provide opportunities for residents to become digitally connected.

Technology is commonly targeted at the youth market and at present older users must try to adapt their abilities to devices that have been designed for younger people. It was clear from our research that family members frequently sought, but rarely found, internet-based devices that were appropriate for users who had physical challenges. This suggests an opportunity for suppliers to meet the needs of this market, which is only going to increase in number in the future.

INTRODUCTION

Background

Social connectedness of older people

A common theme across studies which have focussed on what adds quality to the lives of residents in aged care contexts is that social connectedness matters to most people.[1] Researchers have found that quality of life is maintained or diminished by the types of relationships held with families, friends, staff, and the community and is related to resident wellbeing.[2]

The majority of older adults, but especially those who are institutionalised, experience a myriad of social losses and disruptions to their social support networks[3] [4]. Moving into an aged care residential context can radically alter a person's sense of social connectedness.[5] Aged care residents have often outlived close relatives and friends or have been forced to move away from them, and they are less able to travel and maintain relationships. Low levels of social connectedness are related to a number of negative physical and mental health outcomes, and higher mortality risks, together with a significant reduction in quality of life.[6] [7] [8] Residents of aged care facilities are more likely to become lonely and socially isolated than older adults dwelling in the community.[9] [10] Staff members in care facilities generally have heavy workloads and spend the majority of their time on personal care tasks, with little time for social interaction with residents.[11] Family can provide an important source of social

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[1] Cooney, A., M. Dowling, M. E. Gannon, L. Dempsey and K. Murphy (2014). "Exploration of the meaning of connectedness for older people in long-term care in context of their quality of life: a review and commentary." International Journal of Older People Nursing **9**(3): 192-199.

[2] Murphy, K., E. O. Shea and A. Cooney (2007). "Quality of life for older people living in long-stay settings in Ireland." Journal of Clinical Nursing **16**(11): 2167-2177.

[3] Theurer, K., W. B. Mortenson, R. Stone, M. Suto, V. Timonen and J. Rozanova (2015). "The need for a social revolution in residential care." Journal of Aging Studies **35**: 201-210.

[4] Abbott, K. M., J. P. Bettger, K. N. Hampton and H.-P. Kohler (2015). "The feasibility of measuring social networks among older adults in assisted living and dementia special care units." Dementia **14**(2): 199-219.

[5] Cooney, A., M. Dowling, M. E. Gannon, L. Dempsey and K. Murphy (2014). "Exploration of the meaning of connectedness for older people in long-term care in context of their quality of life: a review and commentary." International Journal of Older People Nursing **9**(3): 192-199.

[6] Adams, K. B., S. Leibbrandt and H. Moon (2011). "A critical review of the literature on social and leisure activity and wellbeing in later life." Ageing & Society **31**(04): 683-712.

[7] Bath, P. A. and D. Deeg (2005). "Social engagement and health outcomes among older people: introduction to a special section." European Journal of Ageing **2**(1): 24-30.

[8] Maier, H. and P. L. Klumb ibid."Social participation and survival at older ages: is the effect driven by activity content or context?": 31-39.

[9] Pinquart, M. and S. Sorensen (2001). "Influences on Loneliness in Older Adults: A Meta-Analysis." Basic and Applied Social Psychology **23**(4): 245-266.

[10] Victor, C. R. (2012). "Loneliness in care homes: a neglected area of research?" Aging Health **8**(6): 637-646.

[11] Tsai, H., Y. Tsai, H. Wang, Y. Chang and H. Chu (2010). "Videoconference program enhances social support, loneliness, and depressive status of elderly nursing home residents." Aging and Mental Health **14**(8): 947-954.

contact and support but geographic distance is often a barrier to frequent communication between residents and some family members, as well as past social networks.

While having meaningful relationships with family and friends facilitates connectedness for older people, environmental factors such as access to newspapers, telephones and television also help older people maintain connections with the world and keep up to date with events.[12] As computing technologies have become increasingly affordable and available, there is an increased societal reliance on internet-based devices. Internet-based modes of communication such as emails and videoconferencing (e.g. Skype) have paved the way for increased interaction to occur between older people, family members, friends, and the community.[13]

The impact of internet-based technologies on social connectedness

Although older people consistently have lower rates of technology adoption than younger adults, this group is more digitally connected than ever. For example, social media is increasingly becoming an important platform where people of all ages find news and information, share their experiences, and connect with friends and family. However, many older people remain relatively divorced from internet technologies. Research has found that only 5% of older people aged 85+ use the internet regularly,[14] which may, in part, be due to difficulties in access once they are no longer living in the wider community. According to recent overseas studies, the rate of participation in using such technologies in the residential aged care context is low.

The research literature has begun to address the psychosocial value of computer use, including as it relates to overcoming social disengagement. A number of studies have reported positive effects for older people in relation to the provision of computer training in various settings including aged care.[15] [16] In one study, a course in computer operation and internet browsing was offered to older adults (mean age of 80) who went to day-care centres or resided in nursing homes. Computer and internet use positively affected their life satisfaction, depression and loneliness.[17] Prior research has also found that loneliness can be

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[12] Buckley, C. and G. McCarthy (2009). "An Exploration of Social Connectedness as Perceived by Older Adults in a Long-Term Care Setting in Ireland." Geriatric Nursing **30**(6): 390-396.

[13] Mickus, M. A. and C. C. Luz (2002). "Televisits: Sustaining long distance family relationships among institutionalized elders through technology." Aging & Mental Health **6**(4): 387-396.

[14] Friemel, T. N. (2016). "The digital divide has grown old: Determinants of a digital divide among seniors." New Media & Society **18**(2): 313-331.

[15] Shapira, N., A. Barak and I. Gal (2007). "Promoting older adults' well-being through Internet training and use." Aging & Mental Health **11**(5): 477-484.

[16] Tsai, H. and Y. Tsai (2011). "Changes in depressive symptoms, social support, and loneliness over 1 year after a minimum 3-month videoconference program for older nursing home residents." Journal of Medical Internet Research **13**(4).

[17] Shapira, N., A. Barak and I. Gal (2007). "Promoting older adults' well-being through Internet training and use." Aging & Mental Health **11**(5): 477-484.

alleviated and perceived social support increased by the use of a once weekly videoconference with a family member.[18] Previous studies have, however, mostly been interventions where formal training and subsequent scheduled use of computers and the internet have been instigated during the study period rather than capturing the informal use of technology as and when it naturally occurs. In addition, there has been little research around family members' interactions with residents using internet-based technologies.

Little is known about older adults' efforts to retain their social connectedness once living in an aged care community setting. Use of internet-based technologies, in particular, remains largely invisible, with residents not included in many surveys and reports at a population level. In addition, research endeavours seem to have ignored efforts by family members or friends to continue social contact using new communication technologies once an older person has entered an aged care community. There is, therefore, very little information on internet-based technology use in the residential aged care sector, and whether there is a need or desire for that use to be expanded. The intent of the current study was to begin to fill that gap.

The research was a 12 month qualitative study to: (1) Investigate to what extent residents of aged care facilities/retirement villages ("aged care communities") interact with family, friends and others via computers, mobile phones, tablet PCs, and other internet-based technologies; (2) Explore attitudes toward, and factors related to, the use of technology-aided interaction between residential aged care residents and family members/friends; and (3) Identify potential strategies to maximise the internet-based social connectivity of residents.

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[18] Tsai, H. and Y. Tsai (2011). "Changes in depressive symptoms, social support, and loneliness over 1 year after a minimum 3-month videoconference program for older nursing home residents." Journal of Medical Internet Research **13**(4).

METHODS

The research consisted of two strands of data collection undertaken in parallel:

Study 1: Interviews with family and friends of aged care community residents

A telephone interview, lasting 20-30 minutes, conducted with members of the public who had a family member or friend living in an aged care community, to find out to what extent internet-based technologies are being used to supplement personal visits and other more traditional forms of keeping in touch.

Study 2: Interviews with residents of retirement villages

Focus groups and individual interviews with residents of two retirement villages to find out their perspectives of using internet-based technologies as a means of maintaining social connections.

Both studies were informed by the following research questions:

- To what extent are internet-based technologies used for social interactions between aged care community residents and their family members/friends?
- Are internet-based technologies used in place of or in addition to personal visits to residents?
- What benefits do internet-based communication methods present to those people who adopt them in the aged care context?
- What disadvantages or problems emerge as a result of adopting internet-based communication technologies in this context?
- What other tasks are undertaken by residents using these technologies?
- Are residents using their own devices or those provided by a residential care facility? If the latter, is there convenient, unhampered access for residents?
- How do internet interactions impact on residents' sense of connectedness with friends, family and the community?
- Are there any barriers to the use of technology in an aged care environment?

Study 1: Telephone interviews with family and friends of aged care community residents

Participants were individuals who had a family member or friend living in an "aged care community". "Aged care community" could mean rest home, hospital, or dementia care, or a retirement village. Interviews were conducted from December 2017 to August 2018.

The study was advertised in local newspapers (Auckland and Hamilton), an online community forum, and by contacting a community organisation. Students and staff of Auckland University of Technology were also invited to participate through posters and advertisements on noticeboards, and emails delivered through various university communication channels.

Eighty people contacted the researchers to enquire about the study. Of these 78 agreed to take part in a 20-30 minute telephone interview but four volunteers were subsequently unable to be contacted, resulting in 74 interviews being conducted.

Where a participant knew more than one person in an aged care community, they were asked to nominate a specific person to talk about, and they were free to choose which one. In a few instances, participants asked to talk about more than one (n = 6). Consequently the number of residents spoken about by participants was 80. We have included these additional residents in our analyses.

The interviewer completed fields in a template during the interview. These were later transferred to an Excel spreadsheet for analysis of the data. Interviews were also audio-recorded so that the researchers could, if necessary, supplement the notes taken during the interview by additional material following completion of the interview.

The average length of interviews was 29 minutes (range: 15-47 minutes).

Study 2: Face-to-face interviews with residents of retirement villages

Participants were residents of two retirement villages in Auckland who were invited to take part through the normal communication channels of village management, such as newsletters delivered and emailed to each resident.

Sixteen residents volunteered to participate in a 30 – 60 minute interview, and were given the choice of taking part in a focus group or an individual interview. Six residents from Village 1 and four residents from Village 2 volunteered to take part in a focus group. An additional six residents from Village 2 opted for an individual interview, although one resident had to withdraw from the study due to ill health of her spouse. Consequently, 15 residents in total participated.

Interviews were audio-recorded and were transcribed by a professional transcriber. NVivo was used for data management and analysis. The two focus groups ran for approximately 1

hour each and the average duration of individual interviews was 47 minutes (range: 39 - 66 minutes).

Ethics

This research was approved by the Auckland University of Technology Ethics Committee: reference nos. 17/392 and 18/160.

STUDY 1 – Telephone interviews with family and friends of residents of aged care communities

In this section we present details of our 74 telephone interview participants and the 80 residents they chose to speak about, together with findings from the interviews.

The interview consisted of 37 questions relating to: (a) background information about the resident, the type of aged care community where they lived, and the traditional ways participants (and other family members/friends) kept in touch with the resident; (b) use of internet-based technologies by the participant and the resident to keep in touch; (c) recommendations by participants for improving the social connectedness of older adults in aged care communities; and (d) demographic information. For the majority of questions, participants chose from set response options; however, there were a number of open-ended questions (e.g. "Can you tell me about the occasions when you visit your [family member/friend]?" Questions were framed so that the identity of the resident and the community in which they lived were not revealed to the researcher.

Participant characteristics

The vast majority of participants (90.5%) were female, which was not unexpected as daughters and other female family members are often the primary source of support for older adults.[19] Over two-thirds (68.9%) of participants were aged over 50, and three-quarters (74.3%) identified as New Zealand European. Table 1 provides a summary of participant characteristics.

Table 1. Characteristics of telephone interview *participants*

Gender	N	%
Female	67	90.5
Male	7	9.5
	74	**100**
Age	N	%
16 - 25	8	10.8
26 – 35	5	6.8
36 - 50	10	13.5
51 - 65	28	37.8
Over 65	23	31.1
	74	**100**

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[19] Horowitz, A. (1985). "Sons and Daughters as Caregivers to Older Parents: Differences in Role Performance and Consequences1." The Gerontologist **25**(6): 612-617.

Ethnicity	N	%
NZ European	55	74.3
Other European	11	14.8
Maori	4	5.4
Pacific	1	1.4
Asian	0	0
Other	3	4.1
	74	**100**

Resident characteristics

As noted earlier, our interview participants talked about 80 residents in all. Sixty-two residents (77.5%) were female (Table 2). Nearly two-thirds (62.4%) were aged over 85. The median age of residents spoken about was 87 years (range: 67 – 102).

Table 2. Characteristics of residents spoken about by participants

Gender	N	%
Female	62	77.5
Male	18	22.5
	80	**100**
Age	**N**	**%**
65 - 70	4	5.0
71 - 75	5	6.3
76 - 80	10	12.5
81 - 85	11	13.8
86 - 90	21	26.2
Over 90	29	36.2
	80	**100**
Ethnicity	**N**	**%**
NZ European	58	72.5
Other European	16	20.0
Maori	2	2.5
Pacific	1	1.3
Asian	1	1.3
Other	2	2.5
	80	**100**
Information on residents' age and ethnicity was provided by participants based on their knowledge of the family member or friend they spoke about. It is possible that, in some cases, they may have inadvertently provided inaccurate information.		

As might be expected, the ethnicity of participants matched that of residents in the majority of cases.

Over four-fifths (81.3%) of participants spoke about a family member, with the remainder telling us about a friend in aged care (Table 3).

Table 3. Relationship of resident to the participant

Relationship	N	%
Mother	29	36.3
Grandmother	9	11.2
Father	7	8.7
Grandfather	4	5.0
Mother-in-law	4	5.0
Sister	3	3.8
Husband	2	2.5
Aunt	2	2.5
Other family member Brother, Brother-in-law, Sister-in-law, Great-uncle, Great-aunt (all n=1)	5	6.3
Friend (13 female; 2 male)	15	18.7
	80	**100**

Characteristics of the resident's aged care community

One-third (33.8%) of residents lived in an apartment within an aged care community (Table 4), although some of these residents did have some meals provided and/or help from care staff with showering and other daily activities. Another third (33.8%) of residents lived in a rest home where full care was provided. The remainder received hospital level care or were in a dementia unit.

Table 4. Type of accommodation of resident

Type of accommodation	N	%
Apartment	27	33.8
Rest home with full care by staff	27	33.8
Hospital level care	19	23.7
Dementia unit	7	8.7
	80	**100**

Nearly three-quarters (71.3%) of our participants lived within a 30 minute drive from the residents they spoke about (Table 5). However, some participants (21.3%) had a family member living in an aged care community in another town, which meant the travel time to visit was over two hours.

Table 5. Travel time by transport to facility from participant's home

Distance	N	%
0 – 15 minutes	36	45.0
16 – 30 minutes	21	26.3
31 – 60 minutes	6	7.5
1 – 2 hours	3	3.8
Over 2 hours	14	17.5
	80	**100**

Over half (57.5%) of our participants visited residents at least once a week (Table 6). Telephone calls were commonly made by participants in between visits, especially when the resident was a close family member.

Table 6. Frequency of personal visits by participant to resident

Frequency of visits	N	%
Several times a week	21	26.3
Once a week	25	31.2
Twice a month	7	8.8
Once a month	8	10.0
Less than once a month	19	23.7
	80	**100**

Technology use

Almost all our *participants* were technology users themselves, although four participants (5.4%) did not own a mobile phone (Table 7). There were also four participants who did not have a computer at home to use. Only two participants (2.7%) had neither a mobile phone nor a computer.

Table 7. Participants' use of technology

Participants' ownership of devices	N	%
Mobile phone		
Yes: simple mobile phone	7	9.5
Yes: smartphone	63	85.1
No	4	5.4
	74	**100**
Computer at home		
Yes (desktop, laptop, or tablet)	70	94.6
No	4	5.4
	74	**100**

Nearly half (46.3%) of *residents* owned some sort of device (mobile phone, desktop computer, laptop, or tablet) with almost a fifth (18.8%) possessing a phone and a computer (Table 8). In most cases, residents (or family members on their behalf) arranged their own internet connection and paid for it themselves, rather than accessing the facility's wi-fi system. Arranging their own internet connection was through necessity as facilities often do not provide wi-fi access to residents.

Table 8. Residents' ownership of technology

Residents' ownership of devices	N	%
Any kind of device (mobile phone and/or computer)	37	46.3
Mobile phone	29	36.3
Computer (desktop, laptop, or tablet)	23	28.8
Mobile phone only	14	36.3
Computer (desktop, laptop, or tablet) only	8	28.8
Has both a mobile phone and a computer	15	18.8
The number of residents who owned a mobile phone (29) and those who owned a computer (23) total more than 37 because some residents owned both. If residents owned a device but no longer used it, they are still included in the above figures.		

Some residents had brought devices they already owned with them when they moved into the aged care community. For others, family members had purchased a device at the time of their move so that communication was easier for the resident and for the family. Some residents had once owned devices but had given up using them about the time they entered the aged care environment because they were now no longer able to manage them. A number of participants reported that, even where the resident had owned, and was still using, devices on moving into the aged care context, the resident (at the time of the participant's interview) was now struggling with operating such devices. Dementia and other physiological issues were impacting on their ability to cope with the challenges of technology use. One participant reported that her mother now only used her iPad to play Patience because she had forgotten how to use it for other things. The family had encouraged her to skype relatives overseas but her mother had refused, saying 'it was too hard and confusing' (P14: female, 66 years, speaking about her 97 year old mother).

As family members often purchased a device for the resident to use, they were influential in deciding what was purchased. They also often chose the particular software application to use, and were instrumental in showing the resident how to use the technology. When a family member had not been involved in the purchasing decision, the choice of technology and software applications for communication was sometimes dictated by what both parties were comfortable using: *We figure out who can do what with technology and when there is a snap we just go with it* (P1: female, 54 years, speaking about 85 year old mother-in-law).

Mobile phone calls/texts were the most common way of communicating with family and friends using internet-based technologies, followed by emails (Table 9). Video-conferencing (mainly using Skype or FaceTime) was also used by some residents but assistance was sometimes required to do this and so a family member would need to be present to help the resident make the call.

Table 9. Technology use for communication between resident and others

Type of communication	N	%
Mobile phone calls and/or texts	22	27.5
Emails	17	21.3
Video-conferencing (Skype, FaceTime, WhatsApp etc)	12	15.0
Social media (Facebook etc)	8	10.0

A few residents had a Facebook account which they used for following the activities of various family members and friends: *My Nana has all the latest stuff because her husband was very tech-savvy so she's got the latest iPad, the latest iPhone, everything. She uses the iPad mostly for emails, Facebook, the Herald … I have FaceTimed her a few times … if we've done a [school] project or assessment I will FaceTime her to show it to her* (P22: female, 16 years, speaking about her 77 year old grandmother).

Encouragement of family members appeared to be an important factor in the uptake of technology and its ongoing use. A participant talked about how family members taught a resident how to use some of the features on his devices: *You go very slowly, step by step, and he writes down all the instructions in this little book. And then he'll say, 'Right, I'll go away and practice'* (P64: female, aged 38, talking about her 93 year old grandfather). Another participant said: *We tried to get her [participant's mother] texting and things like that using her cell phone but she didn't really take to it. She probably would if I got her a tablet or something. I've shown her stuff on my tablet and she goes, 'Oh, it seems so easy', and I've said, 'It is, Mum'. She's got a niece travelling at the moment so she'd like to follow her. … I suppose if I turned up with one [a tablet computer], she wouldn't complain* (P63: female, aged 57, talking about her mother aged 90 years).

Those participants who had devices but now found them too difficult to use often resorted to using a landline telephone as the easiest option for communicating with family and friends.

In addition to using internet-based devices themselves ("direct use" of technology), there were many instances of "indirect use" of these technologies by residents. This is where family members or friends would use their own devices to connect the resident to people and events going on outside of the facility. For example, participants often described showing photos saved on their own devices to residents to keep the resident in touch with what was happening in the family. This was particularly the case when the resident had no devices of their own or limited capability in using technology; looking at photos on a smartphone or tablet was considered to be using technology in a way which was appropriate for the physical and cognitive capabilities of some residents. However, as one participant noted: *On Mother's Day everyone turns up and flick open their phones, 'here's photos of your last birthday, Mum', but seeing these photos is transient and when visitors leave, the photos are gone* (P8: female, 57 years, speaking about 89 year old mother).

Some participants involved residents in other ways. For example one participant's sister, who lives in the South Island, sometimes puts a message on Voxer (a messaging app with voice capability) for the participant to play to their father on her own smartphone. The grandchildren of another resident had set up a family site on an application and it had become a hub for sharing updates on family members' activities with the participant's father.

If residents had any problems with technology, family members were most commonly the first port of call. Occasionally there may be someone within the aged care complex that could assist although this was sometimes another resident rather than a staff member. If this option was not available, then residents (or a family member) sought external help from professional computer technicians.

Participants were asked if they were aware if the aged care facility they visited had a computer residents could use if they did not have one of their own. The majority of participants were not aware of computers being available for residents in common areas, although a few participants reported that the particular facility they were talking about had a 'library' and one or more computers were located there for resident use.

Barriers to internet-based communication

Physiological barriers

Physiological issues were frequently cited as a reason why residents found technology difficult to use. Vision loss (particularly macular degeneration), hearing loss, and arthritis were commonly mentioned in relation to physical challenges. The onset of dementia was also often given as a reason why residents were not interested in using technology (of any sort). Some residents who had once owned internet-based devices now no longer used them as they were 'too complex' for them to understand. One participant reported that she had bought her mother a smartphone before she entered the facility, however, *she hadn't been able to figure out how to use it*, so they had to buy her an older style mobile phone. Since being in the facility with Alzheimers, *she has been unable to use it [her mobile phone] because she forgets to charge it* (P34: female, 45 years, speaking about her 78 year old mother). Another said: *Even a cell phone was too much for her. She had a cell phone but she couldn't use it. We tried but she couldn't turn it on* (P27: female, aged 64, speaking about her 87 year old mother).

The design of devices, particularly small keys which were difficult for those with arthritic hands to navigate and those with vision loss to see, was commonly mentioned as a barrier to device use. In one case only family members had the resident's mobile phone number so that when the phone rang, the resident, who had poor eyesight, knew to answer it (P17: female, aged 70, speaking about her 102 year old mother). Another participant noted that her grandfather had a smartphone but didn't text so often now due to vision impairment (P64: female, 38 years, talking about her 93 year old grandfather).

Environmental barriers

The major environmental barrier for residents using internet-based technologies was that they sometimes required help to initiate an interaction. For some residents, even making a landline phone call to a family member required assistance from facility staff but participants found that this option was rarely suggested by the facility: *If there was an issue they would*

ring the daughter but they don't offer to make a call so the resident can speak to family (P24: female, 62 years, speaking about her 70 year old sister).

Some participants also noted that facilities were not particularly "computer-friendly" environments: *There is no wi-fi in the facility; you have to organise that privately and residents' rooms are not geared to using computers. I did enquire about bringing in my laptop so that I could show Mum a few pictures [stored online] but the facility doesn't have an internet connection [for resident use]* (P31: female, 70 years, speaking about her 96 year old mother).

One participant suggested her grandfather might be interested in skyping with family members but that it would be difficult for him to figure it out without help from staff (P54: female, aged 18 years, speaking about her grandfather aged 86 years).

Ways to improve internet-based communication

Participants considered that personal visits to residents were the ideal way of keeping them socially connected and a few voiced concerns that using new technology might mean people visited less frequently: *The most important communication for Dad is to have somebody right there with him, so he can give them a kiss and say "hello, I love you" and you can't do that on a smartphone (*P33: female, 65 years, speaking about 93 year old father).

However, internet-based methods of communication were viewed very positively as long as they were used to *supplement* personal visits. One participant noted that if her mother had a mobile phone, she would be able to ring her every day instead of just twice a week at present (on the facility's landline) (P34: female, aged 45, speaking about her 78 year old mother).

Another said: *I think it is fantastic. I think the best thing about it is that to some degree it is non-invasive; in other words you can make a post or send a message, like send a text message or send an email, and although it has gone to the person's mailbox or gone on to their Facebook page, it is only viewed when that person decides to look at it. So you can send a message to Mum and she can pick the time that suits her to respond to it. If she's getting her hair done, the likelihood of her making a response is pretty low but when she comes back and she has a cup of tea or she is a bit more rested or she's just sitting down in her chair, she's more likely to respond, so I think the timing thing is quite nice about it* (P20: 45 years, speaking about her 77 year old mother-in-law).

Improving technology design for older users

One of the most common themes arising out of our interviews was the complexity of internet-based devices. Participants suggested there was a market for simpler devices for older people that had not yet been filled, at least in New Zealand. A number of our participants had purchased the simplest mobile phone they could find, or the one with the largest keys, for

their family member but these still lacked the simplicity of use that was needed for an older person who was relatively unused to this type of technology. One participant had bought a mobile phone which was designed for older users: *Mum's is a Doro. It's the only one on the market that you can find that is slightly bigger with the numbers and that to look at ... it was the easiest one that we could find on the market a year ago for an older person. All you have to do is open it up, dial your number, and press the green button* (P35: female, aged 51, speaking about her 87 year old mother). Another participant also talked about a Doro phone which had been purchased overseas, saying: *… you can install say 3 numbers and if she [her mother] pushes a particular button, she gets hold of my brother, and if she pushes another one she gets hold of me, and if she pushes another one she gets hold of her brother* (P67: female, speaking about her 88 year old mother living in Germany).

Ways of supporting the use of technology

Participants considered internet-based technologies could have a positive impact on resident wellbeing but noted that often residents were not capable of using technology on their own and that support from staff was required but was not necessarily available: *It would be nice if the facility offered to make a call for her. 'Would you like to call your family?' But staff are too busy* (P24: female, 62 years, speaking about her 70 year old sister).

A number of participants suggested ways that residential aged care facilities could support the social connectedness of residents: *My general feeling is for facilities to have a data projector that they can link to one of the staff's laptops to actually show them [residents] things like the news or a smart TV, I guess that kind of thing that they could show groups of residents in a common area - things like You Tube clips of music, or things that are happening in the news. They have a big TV in the lounge but they don't have that facility to be able to put the internet onto it. I think that would be a huge help, just something else to keep people really connected with the world* (P33: female, aged 65).

Other participants suggested a regular skype time where residents (or family members) could book a call between the resident and a family member or friend. A lounge area with a large screen could be used and a staff member made available to ensure there were no problems with the call (such as an interruption in the connection).

Opportunities for residents to learn more about technology were also suggested:

They do have the internet at the facility but it is unreliable so improving that could be worthwhile. The facility could provide communal computers for everybody to use and have a member of staff that knows a lot about technology to help residents. Also they could get family members involved (P54: female, aged 18).

If facilities were to offer to teach residents how to use iPads etc, getting whanau on board, asking 'have you thought about a device?', because if it is just to learn how to email, and to

be able to receive emails, isn't that just worth it, because that connection then is so much stronger. Once they've got it, it is a whole avenue that they haven't had. That contact makes all the difference (P37: female, aged 49).

Another participant tried to persuade the facility where her mother lived to have a computer available for residents to use and to have someone to help residents use skype *but that was a 'no-no'* (P40: female, aged 71).

Although family members were often the source of technical support for residents, participants noted that external support would also be useful for many residents so that they could enhance their technology skills: *I could see a place for, and I'm not aware that it happens, a person able to help the elderly use technology more. … They need someone to hold their hand while they learn, so I can see a place for some sort of classes, someone coming in and teaching them, that kind of thing* (P4: female, aged 53). Other participants made similar suggestions: *Have a club or something that comes to the retirement village regularly so that they [residents] have help to work through it, or to upskill them* (P1: female, aged 54). *Why not run a social media class?* (P64: female, aged 38).

One participant told us that she used to work at a school: *I would take a group of children to the rest home and one of the activities we did was we got the children to take either a laptop or an iPad or their smartphone and share something that was on that with an older person. So it might even be like reading the Herald online or looking at the weather forecast, that kind of thing* (P33: female, aged 65)*.*

CASE STUDIES: Study 1

Here we present some case studies to illustrate the use of internet-based technologies by older adults in aged care communities. We have changed the names of participants and residents to preserve their anonymity.

Participant 4: female, aged 53 - "Judy"

Judy's mother, "Betty", aged 89, is in the rest home section of an aged care facility where she is provided with meals except for breakfast which she can prepare for herself in a little kitchen down the hallway from her room. Judy sees her mother two or three times a week and at the weekend sometimes takes her home for family gatherings.

Betty has a mobile phone and a desktop computer and arranged her own internet connection. The handyman at the facility was very helpful when Betty first moved in, helping getting it all connected up for her as Judy was away. Betty got the mobile phone many years ago when she was 'more confident' and family members taught her how to use it. She is quite good at texting so that is one way that she keeps in touch with the family. Judy's children will occasionally text on the spur of the moment to their grandmother. Betty also interacts with Judy's children on Facebook. That way she gets to 'see' them even if she doesn't always get to see them in person. Betty has a network of Church friends and Facebook is a useful way for her to see what is going on in their lives, although one friend visits every week and others every now and then. She uses Messenger (linked to Facebook) if any of the family are away. Betty used to email friends overseas but is doing that less these days because she finds she can't sit at the computer for too long. Her eyes are not so good now so that is a limiting factor. Betty is resistant to using other applications; she does well with what she does do but would not want any change.

Although Betty sometimes has problems with technology, there is a resident in the facility that is the first 'go to' person, if family are not around to help.

Participant 24: female, aged 62 - "Maggie"

Maggie's sister, "Helen", aged 70, has dementia and lives in a rest home in another town. Maggie visits Helen every couple of months and in between phones her on the facility's landline although Helen "never remembers that I have called her". The nurses pick up the phone and take it to wherever Helen is.

Prior to the onset of dementia, Helen used a mobile phone, and looked up things on the internet and was quite active with computers, laptops and phones. She cannot cope with a mobile phone any longer; "she doesn't even remember to turn the TV on". Helen used to

email but is not able to do that now either. She was also on Facebook but it has been two years since she has been able to use social media.

Participant 36: female, aged 28 - "Sarah"

Sarah's grandmother, "Rose", aged 92, lives independently in an apartment within an aged care community, in another part of the country from Sarah. Rose has a laptop (recently upgraded) and a mobile phone. She tried a tablet computer but that didn't suit her – she found it hard on her eyes and she kept touching the wrong icons.

Rose's mobile is often turned off or is not charged so it is getting harder for Sarah to telephone her. Rose is, however, on Facebook which means Sarah can share family photos with her which she does privately. Occasionally they email each other. "Sometimes it can be a little while before she responds back, maybe a week or so - so that kind of says to me that she doesn't check it often, it is not part of her regular routine. I know she appreciates phone calls but it can be hard at times to marry up times when we are both available."

It took a month or so, according to Sarah, before Rose felt comfortable using her new laptop on her own, "so learning and feeling comfortable that she wasn't going to break anything or get lost trying to navigate her way to where she wanted to go to, that might have been a little bit of a barrier for her. Her [Rose's] son came and figured out what it was she wanted to do and put a whole load of bookmarks so it was just one click for her to open pages and one click to open email."

Sarah enjoys the convenience of emailing or using Facebook. "It means I am more regular with my communication because if I phone, that relies on her being next to her phone and so it doesn't guarantee communication, whereas to send a message off and know that it will be there for her when she chooses to open her email or Facebook, that is a guaranteed communication." Sarah is not in the habit of writing letters. "We went through a phase of trying to write each other letters and it was really nice. I think there is something quite nice about putting pen to paper that you don't quite get when you are writing an email but if I was just relying on writing letters for communication it would be very sporadic." Sarah also noted that by using internet-based technologies, her grandmother was hearing more about the day-to-day events of her life rather than just the major things: "When I'm able to send micro-messages, she gets more of an insight into what is happening in the last week or what has prompted me to get in touch with her right now - less bigger picture and more of the granular detail that can be really valuable in terms of maintaining relationships."

STUDY 2 – Face-to-face interviews with residents of retirement villages

In this section we present details of the 15 retirement village residents who took part in this phase of the research, together with preliminary findings from the focus groups and interviews.

The interview topic guide consisted of questions relating to: (a) activities residents undertook in the retirement village; (b) how residents kept in touch with family and friends including the use of internet-based technologies to keep in touch; and (c) any barriers to the use of internet-based technologies.

Participant characteristics

Focus groups were held in two retirement villages. In Village 1, there were 6 attendees (3 male and 3 female); in Village 2 there were 4 attendees (all female). Five individual interviews were also held in Village 2 (Table 10). The average age of participants overall was 81 (range: 71 – 89), with those in Village 2 being older on average (84 years) than those in Village 1 (76 years).

Table 10. Characteristics of retirement village participants

Village	Participant ID	Gender	Age	Simple mobile phone	Smartphone	Desktop computer	Laptop	Tablet
1	1	Female	71		✓		✓	✓
1	2	Female	72		✓		✓	✓
1	3	Male	73		✓		✓	
1	4	Male	77		✓	✓		
1	5	Male	78		✓	✓		✓
1	6	Female	82	✓				✓
2	7*	Female	75		✓		✓	✓
2	8	Female	78	✓		✓	✓	
2	9	Female	83		✓		✓	✓
2	10*	Female	86	✓				✓
2	11	Female	86	✓				
2	12*	Female	87		✓		✓	
2	13	Female	88		✓	✓		✓
2	14*	Male	88		✓		✓	✓
2	15*	Female	89	✓		✓	✓	

* = Individual interviews

All participants had a mobile phone and 14 (out of 15) participants had either a desktop computer, laptop, or tablet (Table 10). All but two of the participants also had a landline telephone.

Keeping socially connected

Retirement village activities

Both retirement villages had a wide variety of activities available for residents. These included exercise classes, walking groups, yoga, tai chi, line dancing, indoor and outdoor bowls, craft groups, card games, quizzes, concerts, lectures, dining events, movies in the village cinema, bus trips, and many other activities. Village 1 employed two Activities Co-ordinators who took care of organising and scheduling activities. In Village 2 the residents themselves organised the majority of the activities, although some events were organised by the management team. *There's actually more to do here than you've got time to do* (P9: female, aged 83).

Participants noted that, although they had made new friends since moving into the village, it was also important to maintain one's existing social connections. They frequently met old friends for coffee or lunch at external venues and also belonged to clubs and groups that were not part of the village activities. In addition, some participants took part in voluntary activities:

We go down to the local primary school and do remedial reading for an hour on Tuesday and there's others who do different days (P5: male, aged 78).

Using internet-based technologies

As can be seen from Table 10, the majority of participants had a number of devices but they often used each one for specific purposes:

The laptop doesn't get used greatly but we bought it because I'm interested in genealogy and going to the night meetings you could take your device … but I must say I prefer to use the desktop and my husband uses it a lot. We do emails and letters and I like making cards to send to grandchildren (P2: female, aged 78).

I have a laptop and an iPad … And I've got a smartphone. I use the laptop a lot. I use it for writing because I'm in a writing group and I do a lot of writing. … I use my iPad for Netflix mainly so I can watch it in bed. (P9: female, aged 83).

I've got a desktop, an Apple, I've got an iPad, don't really know why I've got both because I could manage with just one but I do have both and I use them for different things. I've got a smartphone … I've got a landline, so I'm connected with the outside world (P13: female, aged 88).

Participants used the whole gamut of technologies to keep in touch with friends and family:

I use emails, Facebook, FaceTime, WhatsApp … I've got a friend in Hobart and I speak to him. I used WhatsApp when I was in Cambodia. Just whatever medium's required. (P3: male, aged 73).

It's very easy to pick up the cell phone and talk to them [grown up daughters] and get texts from them, I follow the granddaughters on Facebook to see what they're up to. I found my twelve-year-old grandson now runs, his aunt told me, Snapchat, is it? I'm thinking of adding Snapchat to my collection. The daughter and son-in-law have just been to New York for six days so you know comment on their photos and I have some other friends who are actually currently in France. And again comment on his photos. (P4: male, aged 77).

Nevertheless, landlines were still considered an important part of communication strategies:

Well definitely for me it's the landline … because I have a lot of phoning to do because on my committee, there's eight of us, and if we're doing like a birthday or a funeral or something like that I've got to ring them in order to organise the food you know. … Because a lot of them don't have a computer to be honest at the moment. Or they have a computer but they don't use it you know (P6: female, aged 82).

Internet-based technologies were considered to be not only tools in themselves but a means of having a connection or tie with other people, both of participants' own generation, and those of younger generations:

As I've said before, they [people who don't use technology] miss out in conversations. Look at the conversations we've had about you know like the site you've [addressing another participant] told us about and things like that. This friend of mine, she'd be sitting, we'd be sitting together and she's totally out of the conversation, has no connection with the conversation at all. And also you lose a bit of mana with your children and certainly with your grandchildren if you haven't kept up with it. They think you are a silly old fool I would think (P9: female, aged 83 years).

And one day I went into his [grandson's] room and he was online to this boy and he said to this boy 'Just a minute, my Nan's just come into the room', and I said 'Oh, who are you talking to?' And he said 'Richard' or somebody and he said 'I'll introduce you'. And here was I talking to this boy from Colorado on the screen and he said 'Hello, Nan'. And I thought, you know, I am old because that was magic (P11: female, aged 86).

Barriers to internet-based communication

Availability of appropriate infrastructure

Residents in both villages had been able to arrange internet access, although they organised this, and paid for it, themselves. In Village 1 participants noted that there was village wi-fi available but it was very slow, particularly since more residents had moved into the village,

which was expanding with new buildings being erected. Thus it was considered there were too many users, all trying to get on at the same time. Residents arranged their own wi-fi connection because this was generally packaged with other services:

We all have our own individual wi-fi that we get with our landline and broadband connection. … The TV comes through that too and we all have our line hooked up with Vodafone. But others will have Chorus or whatever else is available (P5: male, 78 years).

All participants had at least a smartphone with which to communicate with family and friends; however, both villages did have one or more computers for residents to use in their 'library' if they needed to do so.

Support with using internet-based technologies

Participants were generally fairly confident in using new technologies although some did require help from family members to keep their devices running smoothly and to learn how to use some of the features:

My son is not in anything to do with IT but he seems to know about computers. And when he was here recently I said to him my iPad is needing charging more often and he said well it's getting old mum, you know. You may need a new one. Anyway while we were talking he sat fiddling with it and fiddling with it and in the end it was fantastic (P11: female, aged 86).

I didn't know until one of the family told me that you can do it by voice instead of texting; you can press an icon and so you say, instead of laboriously texting it out, you just talk into it and say I will see you at three thirty up by the café. And it comes up to the recipient as a text (P8: female, aged 78).

In Village 1, SeniorNet had come into the village and run some sessions:

I've been to two sessions with them over my smartphone. I thought I was fairly savvy but I learnt a bit actually (P5: male, 78 years).

Some Village 2 residents had been to external SeniorNet classes but were not aware of any such classes being held in the village:

I'd love to [attend], if they ran a SeniorNet thing here I'd definitely join it to get more informed (P9: female, aged 83 years).

Security concerns

Participants in our focus groups talked at length about security concerns with the use of technology. A number of participants had been negatively affected by scams; for example, one participant reported that he had phoned an airline on his smartphone to make a booking and scammers had 'infiltrated' his computer via his phone and subsequently emptied virtually all the money out of his bank accounts. Another participant had had money taken out of her

bank account through the PayPal system being compromised. While such experiences did not necessarily impact substantially on their use of the internet for communicating with family and friends, they did make them very cautious about the types of activities they carried out on the internet. For example, several participants did not use internet banking, and they were wary about buying goods online. Participants also expressed frustration at the number of attempts at scams that they had to deal with:

A *friend of mine told me she got this call on her smartphone and music rang out and the next thing a Chinese voice chatted away and so we said how on earth did they get your number but, would you believe it, within a week I got exactly the same phone call. So the moment I heard it I just deleted it and never had it since so I think it was a scam of some sort going around* (P1: female, aged 71 years).

CASE STUDIES: Study 2

These case studies illustrate the use of internet-based technologies by older adults in the two retirement villages included in the study. Again, we have changed the names of residents to preserve their anonymity.

Participant 14: male, aged 88 - "John"

John moved into the retirement village about six months ago, and lives independently with the support of his children who visit frequently and are in touch several times a day. He has a smartphone, a laptop, and a tablet computer. He also keeps in touch with family members via his mobile phone and his tablet; at present the latter "has a bug in it and I can only send and receive emails". He has a landline but prefers not to use that to phone people because, due to arthritis, he finds keying in the numbers difficult. One of John's daughters has been teaching him how to send emails using the inbuilt voice recognition software in his mobile phone rather than having to type out messages. John also has problems with his eyesight so he uses a magnifying glass to look at the keyboard on his phone.

Participant 13: female, aged 88 - "Ruth"

Ruth has been living independently in the retirement village for the past six years. She has a smartphone, a desktop computer, and a tablet. The desktop she uses for research for 'U3A stuff' and also for skype calls to a daughter living overseas, whereas her tablet she uses for emails and for reading books which she downloads from the public library. Betty likes receiving e-cards at Christmas: "they're quite fun really because they're animated, and they do things". Betty isn't interested in using social media: "The family do and they keep in touch with each other overseas but I think it might be a time waster so I don't".

Participant 15: female, aged 89 - "Honor"

Honor lives independently in the retirement village, and has been in the village for three years. She has a son and a daughter but both live overseas. Honor has a simple mobile phone, a desktop computer, and also a laptop (which she is having problems with at the moment). Honor's son phones every fortnight on her landline, while her daughter "insists" Honor uses the internet: "she wants to make me okay with new technology". Honor uses her desktop computer for emails, "I'm not interested in anything else". Her friends are 'computer mad' – "I mean I've got friends in Probus [a club for retired people] and they're in touch every day on the computer. I don't understand it. I'd rather ring them and talk to them one by one". Honor also prefers to phone friends to make arrangements to meet, rather than using her

mobile to text. She keeps her mobile for emergencies only; for example, when she goes out at night.

There is a resident in the village who she goes to if she has any problems. "She's been very helpful but she won't let anybody pay her. I'm obviously not confident as far as computers are. I try but it's not my thing." Nevertheless, Honor says that "you have to be with it" and that there are certain things computers are useful for.

CONCLUSIONS

The two studies comprising this research have contributed to clarifying the extent to which, and how, internet use is being undertaken and experienced by older people in residential aged care communities, and any challenges associated with being part of the online community. Understanding internet use in this context will, we hope, enable deficiencies in access to be identified and potentially remedied.

Whilst it is evident that personal visits are very important in keeping residents connected to family and friends, our findings indicate that internet-based technologies can play an important role in supplementing those interactions.

It is clear that family play a significant role in ensuring residents have meaningful social interactions and that opportunities for internet-based communication are often enabled and maintained through the efforts of family members. As older adults incorporate internet-based technologies into their daily lives and seek assistance from social ties and experts in learning to use those technologies, they may also be indirectly combating the threat of isolation and loneliness because of these increased social interactions.[20] The importance of family does, however, raise the question of what happens to residents who do not have that type of social network to ensure the resident's inclusion in the online community?

Participants in Study 1 observed that there was room for aged care facilities to take more initiative in providing learning opportunities and activities which could introduce technology to residents who do not have other means to be involved in the digital world. This suggests that there is a gap in social care which aged care operators could look at addressing. Participants also identified design shortcomings with current devices which impede older adults' use of technology; this suggests there is a major opportunity for hardware manufacturers and software developers to address the needs of the older user.

The findings from this research will have application across the aged care sector and will add to the current public dialogue concerning positive ageing. It is hoped that the findings will assist residential aged care operators, retirement communities and senior centres to develop age-friendly digital environments.

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[20] Francis, J., T. Kadylak, T. W. Makki, R. V. Rikard and S. R. Cotten (2018). "Catalyst to Connection: When Technical Difficulties Lead to Social Support for Older Adults." American Behavioral Scientist.