PROJECT EVALUATION
APRIL 2025

TECH-EMPOWERED HEALTHY LIVING FOR SENIORS WITH DEMENTIA

Human Endeavour

INTERVENTION RESEARCH / IMPACT EVALUATION STUDY

A COMMUNITY–ACADEMIC PARTNERSHIP

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Lois Kamenitz, PhD, Principal Investigator, York Centre for Asian Research, York University
Noor Din, M.Eng., Founder and CEO, Human Endeavour
Quanbin Zhang, MA, Research Assistant, Human Endeavour
Sehr Sulaiman, MA, Research Assistant, Human Endeavour
Shakila Sadaf, BA, Research Assistant, Human Endeavour

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The keen engagement of funders, partners, managers, carers, and seniors with TEHL and the associated research study on the impact of TEHL was inspirational for the TEHL design and research team. Their unwavering support of Human Endeavour's vision and the TEHL project and their contributions to the research study are greatly appreciated.

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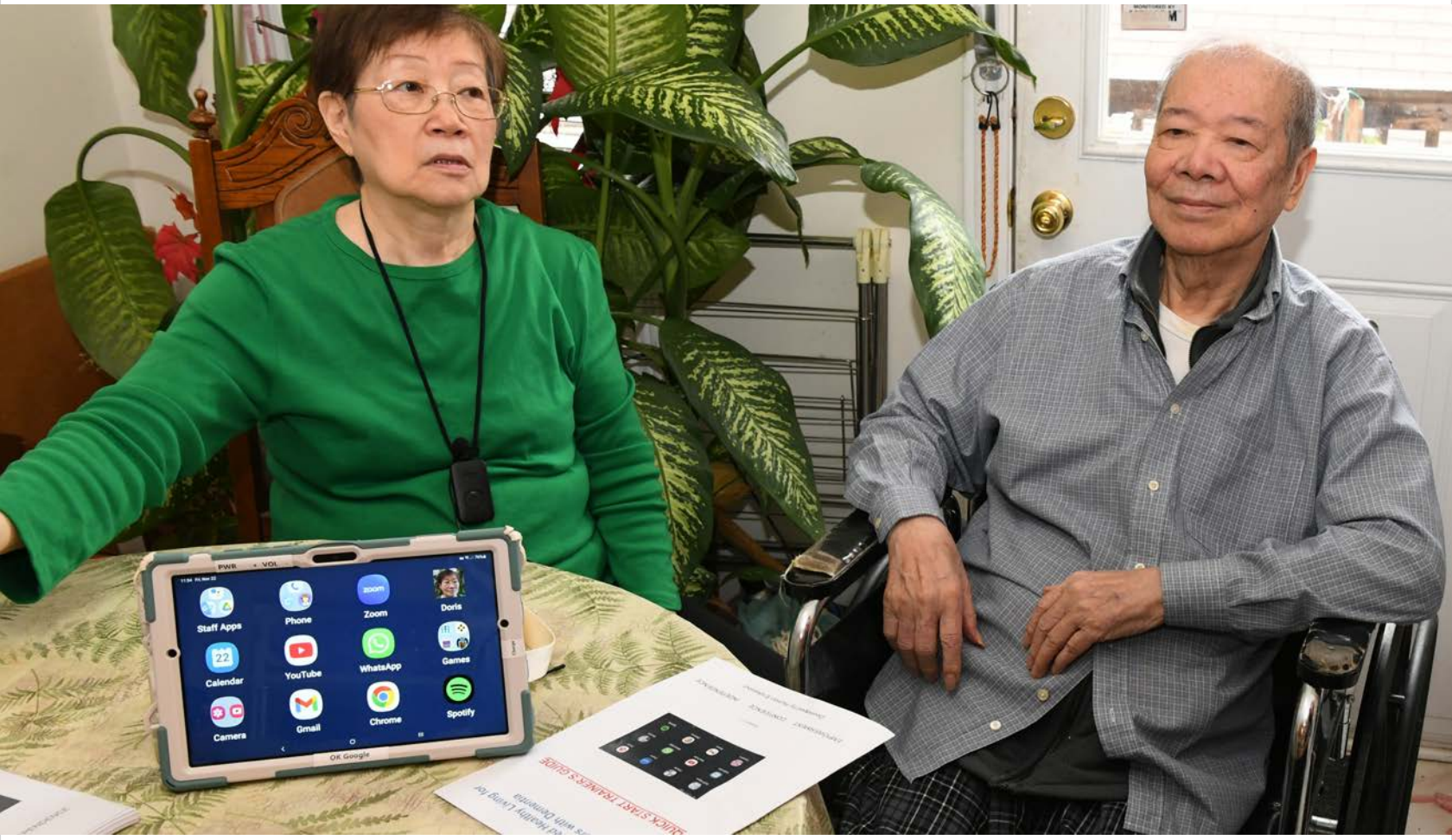

Ms. DORIS (CARER) AND Mr. GEORGE (SENIOR)

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EXECUTIVE SUMMARY

In late 2022, the Public Health Agency of Canada issued a call for innovative and advanced solutions for people living with dementia. In response to the call, Human Endeavour proposed a project focused on seniors.

Tech-empowered Healthy Living for Seniors with Dementia (TEHL) was a unique project that involved collaboration among various stakeholders to improve the well-being and quality of life of seniors living with dementia through assistive technologies in the community. Most of the interventions and support services for people living with dementia that are provided in health-care settings are inaccessible to seniors who prefer to age in place and their carers (caregivers). (Note: In this project, the term “carer” or “caregiver” is used for individuals who provide a range of support [e.g., physical, emotional] to people living with dementia without pay, such as family members, partners, friends, or neighbours.) This project addressed this gap through a first-of-its-kind customizable and innovative assistive technology solution that enhanced the ability of seniors living with dementia to age in place. A research advisory board comprising project partners was established for the project, to assist in obtaining and incorporating feedback during the implementation and delivery of the project.

The project had three objectives:

1. To improve the quality of life and well-being of people living with early-to-moderate-stage dementia and their caregivers through a first-of-its-kind customized assistive technology solution, with related training and support.

2. To carry out intervention research (also called an impact evaluation study) to measure the effectiveness of the technology and its impact on the lives of seniors living with dementia and their carers (caregivers) throughout the duration of the project to enhance and scale the project's offerings. (Throughout this document, we will use the term “impact evaluation” to align with the requirements of the Office of Research Ethics of York University.)

3. To share findings from this intervention on how to reach and successfully engage seniors living with dementia and their carers (caregivers) with this technology.

The solution consists of an Android tablet with built-in intelligence, automation software, voice- or touch-based operation, data/internet access, remote login support for debugging problems, training for frontline staff, technical support through an illustrated multilingual trainer's manual, and a multilingual call centre for caregivers and frontline workers. The built-in internet access and remote login features for debugging make this technology effective for people living in all Canadian communities, including rural and remote areas.

Furthermore, if the tablet has not been used in a while, Human Endeavour can inform the caregivers to check in on the user's safety. The tablet was also made available to people with mild cognitive impairment who wanted to enhance their independence. The project reached out to partners, carers, and seniors in Ontario and Alberta and distributed 110 tablets in these two provinces.

Clients were given one of these tablets for assistance that made decisions and took appropriate actions on the basis of various conditions and preprogrammed parameters. The tablet was programmed to respond to voice commands, offered information, and sent important reminders about routine activities of daily living, such as meals and medications, in 15 preprogrammed languages, including immigrant languages commonly spoken in Canada (English, French, Italian, Mandarin, Spanish, Punjabi, Portuguese, Arabic, German, Urdu, Hindi, Russian, Polish, Tagalog, Tamil). Its multilingual nature removed many language barriers Canadian immigrants face, making it an equitable solution for communities across Canada. It also collected responses from seniors living with dementia for important activities of daily living specific to that participant to support them and their caregivers; for instance, if a senior did not complete a scheduled task, the tablet sent an email to the caregiver for potential intervention. The hope was that the vital prompts and interaction between the tablet, the person living with dementia, and their caregiver would support better nutrition, timely medication intake, socialization and recreation, sleep improvement through bedtime reminders, and risk mitigation for the health and safety concerns of seniors living with dementia.

As part of this project, a select group of seniors with dementia and their carers were given a location tracker, a separate small device to ensure the safety and independence of the senior while they were outdoors. A senior can wear the tracker around their neck, put it on a belt, or carry it in a purse. It will send the carer an email and/or a text message when the senior carrying the device leaves or enters their home address, and it tracks the real-time location of the senior minute by minute while they are outside their home. An SOS button for sending a text message to the carer in an emergency is an important feature of the tracker. The seniors and carers who used the tracker reported it to be very useful.

REVIEW
OF SELECTED LITERATURE

The purpose of this review is to examine a selection of the scholarly literature on dementia, memory issues, the carer experience, and aging and technology (gerontechnology).

DEMENTIA: FACTS & FIGURES

The World Health Organization (WHO) estimates that around 50 million people globally have dementia,[1] with projections indicating this number could triple by 2050. Every year, nearly 10 million new cases are diagnosed. In Canada, the Public Health Agency of Canada (PHAC) reported that between April 2022 and March 2023, nearly 487,000 individuals aged 65 years and older were living with a diagnosed case of dementia and that approximately 99,000 new cases were diagnosed in that age group in that time period.[2] These statistics reflect only individuals who have been formally diagnosed by a health-care professional; the actual number of cases may be higher.[2] The Alzheimer Society of Canada's 2022 Landmark Study forecasted that by 2050, 1.7 million Canadians will be living with dementia, nearly three times the 2020 figure.[3]

As PHAC explains, dementia is an umbrella term for a range of symptoms affecting brain function.[2] It is chronic and progressive. There are several types of dementia, each with its own cause. While treatments exist to manage symptoms and improve quality of life, there is currently no cure. Dementia involves cognitive decline, including decline in memory, planning, language, and judgment. It also causes physical changes such as loss of coordination, bladder control issues, muscle weakness, difficulty with movement, and shifts in mood and behaviour. Caring for someone with dementia can be challenging, especially if the individual wants to remain in their home and community.

The high mortality rate from COVID-19 among seniors in long-term care (LTC) facilities has led to a phenomenon that some researchers have called “nursing home aversion.”[4] The Canadian Institute for Health Information reported that, in June 2020, although Canada's overall COVID-19 mortality rate was relatively low compared with that of other countries in the Organisation for Economic Co-operation and Development (OECD), it had the highest proportion of deaths occurring in LTC. Of all COVID-19-related deaths in Canada at that time, 81% were among LTC residents.[5]

With the COVID-19 death rates still on seniors' minds in Canada, 93% are opting to live in private dwellings (house, apartment, or moveable dwelling) while just 7% are living in collective dwellings such as residences for senior citizens, LTC, or health-care facilities. As noted earlier, aging in place comes with some challenges for seniors with dementia.[6]

CARING FOR SOMEONE LIVING WITH MEMORY ISSUES OR DEMENTIA

Family caregivers/carers play an important role in supporting a person living with dementia. Their perceptions of both the negative and the positive aspects of being a care partner have been well documented.[7-9]

Hazzan and colleagues conducted interviews with caregivers to explore how care responsibilities impact caregivers' quality of life and how caregivers' quality of life in turn impacts the care they provide.[7] A recurring theme in their interviews was the high level of stress felt by caregivers, which impacted their overall health and well-being. Caregivers reported that they experienced anxiety, depression, and "emotional fatigue." Their loved one's memory loss and their overall decline in cognitive functioning, their loss of independence, and the progressive and unpredictable nature of symptoms such as aggression and confusion were especially challenging, and they often led to the caregiver feeling helpless and overwhelmed. Caregivers in this study talked about the feelings of loss and grief they experienced as the condition of the person living with dementia worsened, and they said that their own need for support increased. These feelings exacerbated their emotional fatigue.

Mitigating somewhat the many challenges associated with caring for someone living with dementia are a sense of purpose and feelings of fulfillment experienced by the caregiver. Having a positive attitude about meeting the care needs of a loved one, as well as the value of engaging with a support network of family, friends, and professionals that serve to develop new social networks and strengthen and expand existing ones, can also mitigate the challenges.

Reflecting on these positive aspects of caring for a person living with dementia, Cunningham and colleagues' work is thought-provoking.[9] They challenge researchers and individuals providing care to look beyond the "loss-deficit" model and consider a more nuanced approach to understanding the dynamic nature of being a carer for someone living with dementia. They ask us to consider such positive aspects of the carer experience as enhanced growth, improved resilience, and greater empathy. In their research, as in the work of Hazzan and colleagues, many carers reported that the care they provided gave them a sense of purpose and fulfillment especially in those moments when they felt that they were making a positive difference in the life of the person they were caring for. It is important to both recognize and use the emotional rewards associated with caregiving to better support caregivers.

While Cunningham and colleagues acknowledge that the positive feelings carers have about providing care may lessen as their loved one's condition declines and the person requires a higher and more complex level of care, they believe that the loss-deficit model, with its emphasis on the "burden of care" and on reducing negative emotions such as stress and depression, misses out on some important aspects of carer well-being. What is needed, according to these authors, is a more multilayered understanding of what wellness means to individual carers at various points in their loved one's dementia journey.

TECHNOLOGY AND AGING: GERONTECHNOLOGY

The demographics of Canada are shifting. According to an Employment and Social Development Canada report (2021), the number of women and men aged 65 years and older has surpassed the number of children aged 0 to 14 years.[10] The greying of Canada's population has implications for the provision of services for older adults, with research supporting the desire of older adults to age in place. According to the same report, just 7% of seniors live in congregate settings, with 93% living in private households.[10] These figures would include the very old with chronic and progressive conditions including dementia.

Bouma and colleagues discuss the "harmonization" of two distinct developments in society today.[11] One is, as noted, the greying of the population, a shift that became apparent about 20 years ago, and the other is the growth of technology. Gerontechnology highlights the interplay between these two significant developments. This interdisciplinary field of research emerged in the 1990s; it combines the study of aging with research on the use of technology to enhance the well-being of older adults and support their independence.[11],[12] With nearly all seniors opting to age in place in their homes and communities, the Canadian government has emphasized the crucial role that technology and innovation can play in supporting them.[13]

Studies focusing on the potential of intelligent customized tablets and other assistive technologies to help older adults with dementia living at home emphasize the importance of customizing technology to the needs of each individual, involving caregivers and people living with dementia in the development of new technology, and integrating these technologies into daily routines to enhance the quality of life of people living with dementia.[14],[15] Kenigsberg and colleagues examined how assistive technologies (AT) can support people with dementia by enhancing their capabilities.[15] They looked at the function of AT in everyday life, and the benefits and the challenges associated with implementing those technologies.

For Kenigsberg and colleagues, it is not just about developing AT; it is also about what people can do with the technology to become more independent. In addition to the capability framework, Kenigsberg and colleagues utilized the "biopsychosocial model of disability" introduced by the World Health Organization. This model views dementia as a disability and AT as a tool that can promote autonomy and help people with dementia become more independent. This model also recognizes that AT should be customizable to users' needs because different tools may be needed to enhance independence for different people. Finally, he looked at the "organizational approach," which describes a set of activities that an organization carries out to deliver a valuable product or service to its customers. According to this model, AT should be properly designed and tested to ensure that it is useful to people with dementia.

On the matter of usability, Chien and colleagues raise a cautionary note for those developing AT for people with dementia.[16] They highlight the importance of developers understanding dementia and the complex and progressive nature of symptoms, which requires that the technology be able to adapt:

> **Disease progression requires adapting to evolving symptoms. Recommendations include versatile, multifunctional technology designs; accommodating diverse needs; and adjusting software functionalities for personalization. Product feature classification can be flexible based on user conditions.**

They interviewed people living with dementia and their caregivers about a web-based interface specifically for people living with dementia and their caregivers. While it is outside the scope of this report to discuss their evaluation in detail, what was relevant to the evaluation discussed in the present report was Chien and colleagues' experience obtaining feedback from older adults with dementia and their caregivers and the insights they gained about the design features that were most important to this group: simplicity, clear navigation, and personalization.

Human Endeavour understands that people living with dementia are diverse and at various stages in their dementia journey; their care needs are complex, and they change over time. Seniors living with dementia also have varying levels of digital literacy and different degrees of interest in, and comfort with, new and evolving technologies. The challenges that carers face also need to be considered, especially those of unpaid family carers as they juggle multiple demands as well as their own health issues in some cases. Recognizing the need for innovative solutions that leverage technology, automation, and intelligence to enhance the well-being of older adults and their carers, Human Endeavour built on their success with the Technology, Access and Support for Seniors (TASS) tablets in 2020 to develop the innovative and cutting-edge TEHL tablets. Our evaluation of those tablets follows.

RESEARCH

METHODOLOGY

A barrier to seniors with dementia utilizing technology is that the existing off-the-shelf technology does not meet their specific needs. They need simplified, individualized, and customized technology. To help promote independence and empower individuals living with dementia and memory issues, Human Endeavour, in partnership with local organizations, secured grants to provide free Android tablets (referred to as TEHL tablets) to seniors that were preloaded with apps, access to data plans for online connectivity, and security features. These tablets automatically send voice reminders and verification prompts for important daily activities in 15 programmed languages. The tablets interact with the senior through voice commands and with carers through auto-generated text messages and emails when their loved one fails to complete important tasks. The tablets also enhance the safety of seniors with dementia and memory issues and their social connections through simplified programmed telephone calling to caregivers, friends, family members, and health-care providers.

The TEHL project was framed within the field of gerontechnology.[11,12] York University conducted an impact evaluation study to assess the efficacy of the technology, to identify any necessary changes to the technology, and to assess the impact the tablets had on organizations and on the health and well-being of carers and seniors. The results of the evaluation will guide improvements and ensure that the technology meets the needs of organizations, carers, and seniors. The study was conducted in three stages.

Establish Research Protocol

Recruitment/ data gathering

Data analysis/ final report/ next steps

In Stage One, a research protocol was established, a research advisory board was convened, and an ethics protocol and the selection of data-gathering instruments were approved by the Office of Research Ethics at York University (reference # e2024-149). In Stage Two, both quantitative and qualitative methods were used to gather data from three distinct populations: community organization managers, carers, and seniors. In Stage Three, the data were analyzed, next steps and recommendations were discussed, and a final report was prepared.

TEHL RESEARCH PARTICIPANTS

PARTNER ORGANIZATIONS IN ONTARIO

Alzheimer Society Brant, Haldimand, Norfolk, Hamilton Halton
Community & Home Assistance to Seniors
Human Endeavour
Punjabi Community Health Services
Senior Persons Living Connected
VHA Home HealthCare

PARTNER ORGANIZATIONS IN ALBERTA

Alzheimer Calgary
Centre for Newcomers (Calgary)
Punjabi Community Health Services (Calgary)
South Asian Senior Support Society (Calgary)

Two methods were used to collect data: an online survey, which took on average 20 minutes to complete, and in-depth interviews conducted over Zoom. The online survey, created using SurveyMonkey, gathered basic demographic information and asked questions about digital literacy, the features of the tablet, and its impact.

- For organization managers, the survey focused on the manager's technology skills and knowledge, the features of the tablet, the tablet's effect on their organization, their perceptions of the carers' and seniors' use of the tablet, and their perceptions of the tablet's effect on the health and well-being of the carers and seniors.

- For carers, the survey focused on their technology skills and knowledge, the features of the tablet, and how the tablet influenced the health and well-being of the senior and their own health and well-being.

- For seniors, the focus was on their technology skills and knowledge, the tablet's features and their use of the tablet, the impact of the tablet on their social, emotional, cognitive, and physical well-being, and the impact of the tablet on their sense of independence, safety, and security.

Additionally, in-depth interviews were conducted with organization managers, carers, and seniors to explore these topics in more detail.

Where necessary, translation was provided by the staff of organizations participating in the study, Human Endeavour staff, or a family member, ensuring that no carer or senior who wished to participate was left out. Support was also available from staff on the Human Endeavour helpline.

The TEHL tablets were co-designed with the project's community partners and with people living with dementia, as were the research instruments for the impact evaluation. We wanted to ensure that both the survey and the interviews were “dementia friendly.”

We received valuable feedback on the design of the survey and interview prompts for seniors from people with lived experience of dementia on the Community Advisory Committee of the Canadian Dementia Learning and Resource Network (CDLRN).[17] People living with dementia were consulted and provided with an opportunity to review the survey and interview prompts and offer suggestions for changes. Their suggested changes were then incorporated into the survey and interview prompts. Interviews and open-ended survey questions were transcribed using a program called Transkriptor. Open-ended survey responses and interview responses were coded using AI-enhanced MAXQDA, a program for qualitative and mixed methods data analysis. Interview transcripts and open-ended survey responses were coded for common themes. Coding was an iterative process consisting of repeated rounds of analysis.[18]

Important goals for the analysis of the data were gathering information to improve the tablets, ascertain the extent to which managers could highlight benefits of the tablets to their organization, and determine the extent to which carers and seniors could identify improvements in their technical knowledge and skills, their overall health and well-being, and the safety, security, and independence of the seniors.

FACTS & FIGURES
ONTARIO AND ALBERTA

The diversity of the seniors who responded to the survey and participated in interviews is evident in the demographic chart that follows.

Number of tablets distributed	**110**
Number of manager surveys completed	**12**
Number of carer surveys completed	**33**
Number of senior surveys completed	**24**
Number of manager interviews completed	**7**
Number of carer interviews completed	**7**
Number of senior interviews completed	**7**

Average age of seniors with dementia who received a tablet	**77 (range 59–97)**	
Age groups of carers (based on responses to carer survey question Q4)	**24% (80–89 years)** **30% (70–79 years)** **24% (60–69 years)** **21% (30–52 years)**	
Gender of seniors with dementia who received a tablet	**Female** **Male** **Two-spirit**	**51%** **48%** **1%**

Percentage of seniors who lived with their carer (based on responses to carer survey question (Q5)	**65%**
Languages spoken by seniors with dementia who received a tablet	**Cantonese, Mandarin, English, French, German, Greek, Gujarati, Hindi, Italian, Punjabi, Spanish, Tamil, Urdu, Tagalog**

RESEARCH FINDINGS

While the findings are presented in a single report, the report encompasses three distinct components. First, we conducted surveys and interviews with organizational managers. Next, we gathered feedback from carers through surveys and interviews. Finally, we engaged with seniors — the end users of the tablet — through surveys and interviews.

The surveys and interviews for both managers and carers included questions about their perceptions of the seniors' use of the tablet and its impact on the seniors' well-being. We deliberately sought input from seniors last to ensure we had a clear understanding of their overall response to the tablet before asking them to participate in the survey or an interview. We also consulted individuals with lived experience, members of the CDLRN's Community Advisory Committee. Their feedback was invaluable, as we sought their insights on the development of the survey and their guidance on how to conduct dementia-friendly, empowering interviews with seniors living with dementia.

IN THE VOICES
OF THE MANAGERS

BENEFITS OF THE TEHL PROJECT
TO PARTICIPATING ORGANIZATIONS

One hundred percent of the managers who participated in the study and their team members either strongly agreed or agreed that they could identify benefits to their organization of having the TEHL tablets.

> ***Our agency is extremely excited to be involved in this positive life impacting initiative for persons living with dementia and their care partners. We are also very happy to be engaging with new health-care/social service providers in Ontario and other provinces to learn, share, and celebrate.***
>
> ***There are less and less supports available as funding is cut across provinces. It is nice to have something to offer when our clients are not finding support in many places. Thank you.***

Another barrier is the cost for seniors of tablets, Wi-Fi, and data plans. Managers discussed the high cost of off-the-shelf tablets, internet connectivity, and data plans and stated that for many of their clients, their budget would not have stretched to buying a tablet after they purchased necessities. The managers appreciated that the TEHL tablets are provided free of charge to participating seniors. They have built-in internet/data, built-in voice SIM, and built-in security software to protect against malicious websites.

> ***...seniors are on their pension plans. Many don't have money. They can't buy a tablet because they say it's better to spend money on other stuff. They say they aren't going to take care of themselves as they should do if they spend money on other things. So, I think that's really, really very beneficial for our clients but also beneficial for the organization because we have added a new feature to our services.***

The tablet's ability to verbally communicate with seniors in one of the 15 supported languages was seen by managers as an important feature. Especially important for several organizations is the fact that the reminders for activities of daily living are available in the 15 supported languages.

> *I think it is huge for our community and something that can integrate really well within the cultural aspect... We get the reminders in Urdu. Yeah. People who speak Urdu at home like the reminders in Urdu mostly.*
>
> *The tablets are very innovative and practical... technology enables our organizations to deliver services to a greater number of people.*

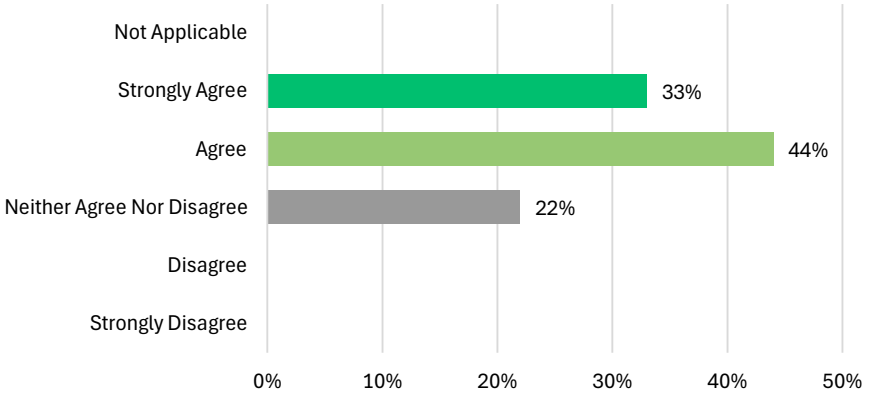
Noteworthy is how the tablet project benefits the organization by fostering teamwork, excitement, and a shared goal among staff members. The tablets also bring a positive aspect to the organization's work, contrasting with the often challenging nature of their day-to-day work and improving staff morale.

> *I think it's bringing us all together to work towards something great which is exciting.*
>
> *Well, many of our days we're talking about who's declined. Right. What changes are happening and how to help caregivers cope and so it's nice to talk about what's changing for the better and what's helping people, what's giving them some stress relief.*

Managers also shared the positive comments they received from seniors and/or their carers. There was general excitement about trying something new. Seniors and carers expressed satisfaction with the tablets to the organizations and noted that they felt "supported after receiving the technology." Where managers responded "not applicable" when asked if they had received positive feedback from seniors and their carers, it is because they had not yet received any feedback from these individuals.

For those seniors for whom the tablet did not work, their dementia had progressed to the point where they were unable to successfully navigate its features or respond to reminders.

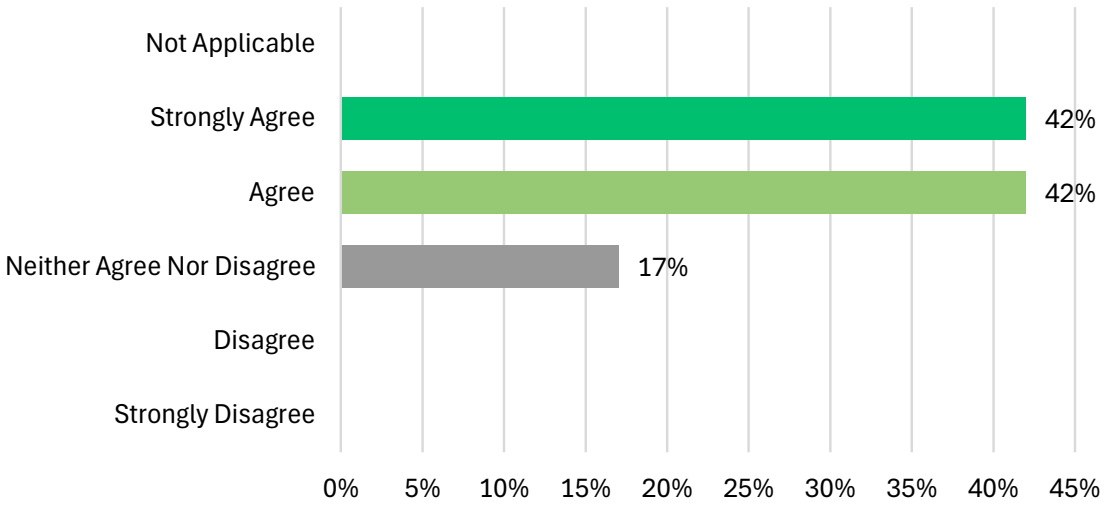
Q22: I/my team have received positive feedback from seniors and/or their caregivers on the tablets. (Note: There were 12 respondents. The 3 "not applicable" responses were excluded.)



MANAGERS' FAMILIARITY WITH DIGITAL TECHNOLOGY

In the online survey, managers were asked about their own familiarity with digital technology, because their ability to support seniors and their carers using the dementia tablets depends largely on their own digital literacy. Eighty-four percent either strongly agreed or agreed that they and their team were knowledgeable about digital technology before receiving the dementia tablets.

Q13: I/my team was knowledgeable about digital technology before receiving the TEHL tablet. (Note: There were 12 respondents.)



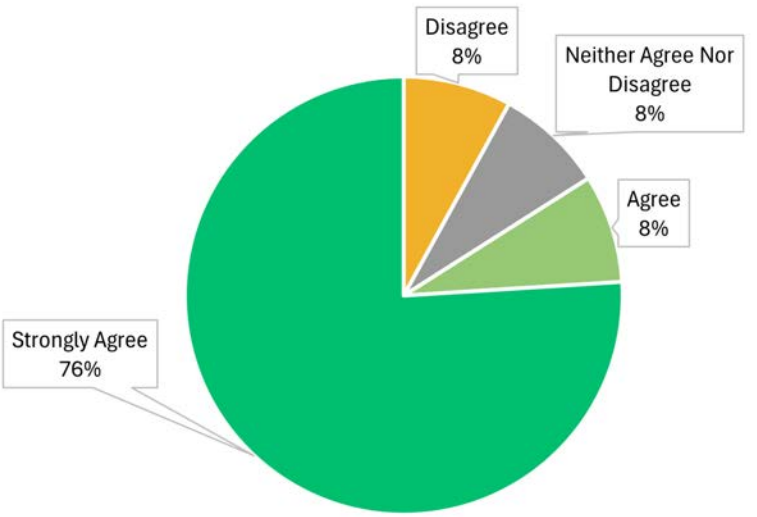
TRAINING AND TECHNICAL SUPPORT AFTER MANAGERS AND/OR STAFF OF PARTICIPATING ORGANIZATIONS RECEIVED THE TEHL TABLETS

Some training was done one on one either in person or on Zoom. Training also occurred in an in-person group setting such as an all-staff meeting or on Zoom. Managers reported that their teams received sufficient training.

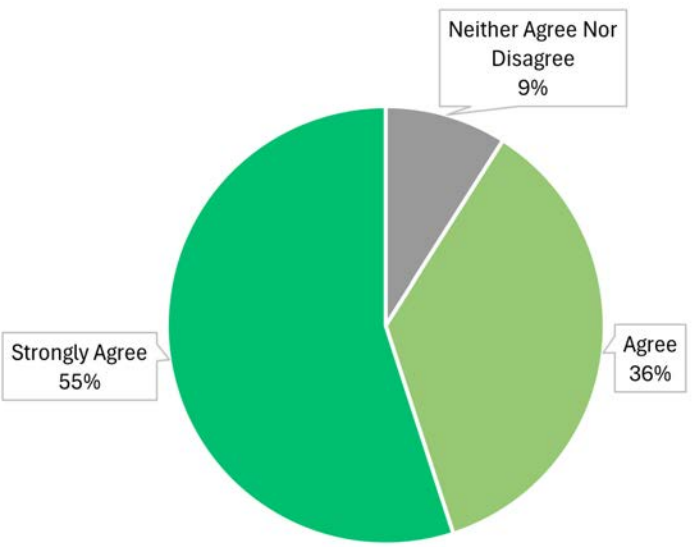
Managers were introduced to the TEHL trainer's manual and the helpline for real-time support including remote access to troubleshoot issues arising on tablets.

> ***The training was informative. They went into a lot of detail with the tablet and all its functions... I think overall it was really in depth, and I liked how they provided us with the manual with all the information to refer to.***

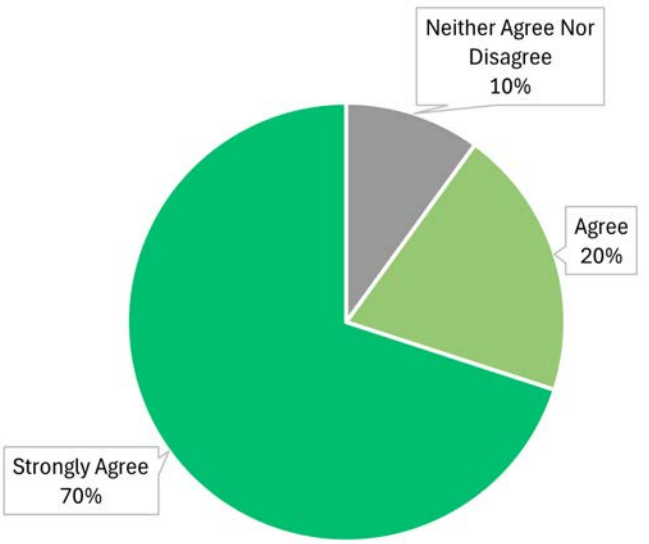
Q14: I/my team received sufficient training on the tablet. (Note: There were 12 respondents.)



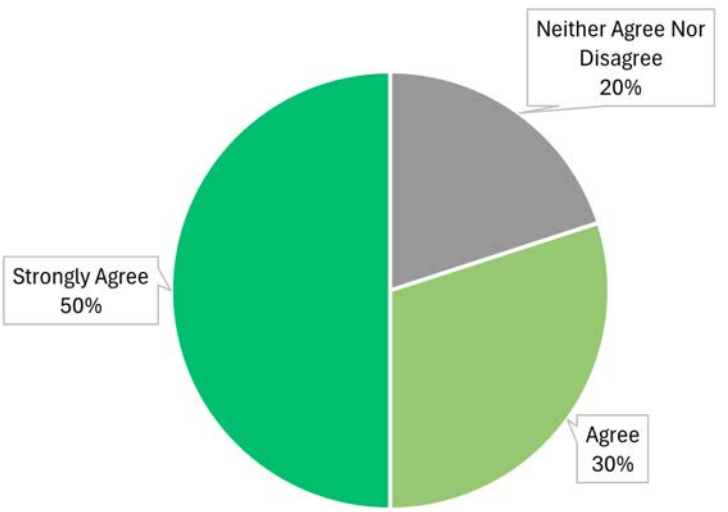
Q15: I/my team found the trainer's manual helpful. (Note: There were 12 respondents. The 1 "not applicable" response was excluded.)



Q16: I/my team found the helpline helpful. (Note: There were 12 respondents. The 2 "not applicable" responses were excluded.)



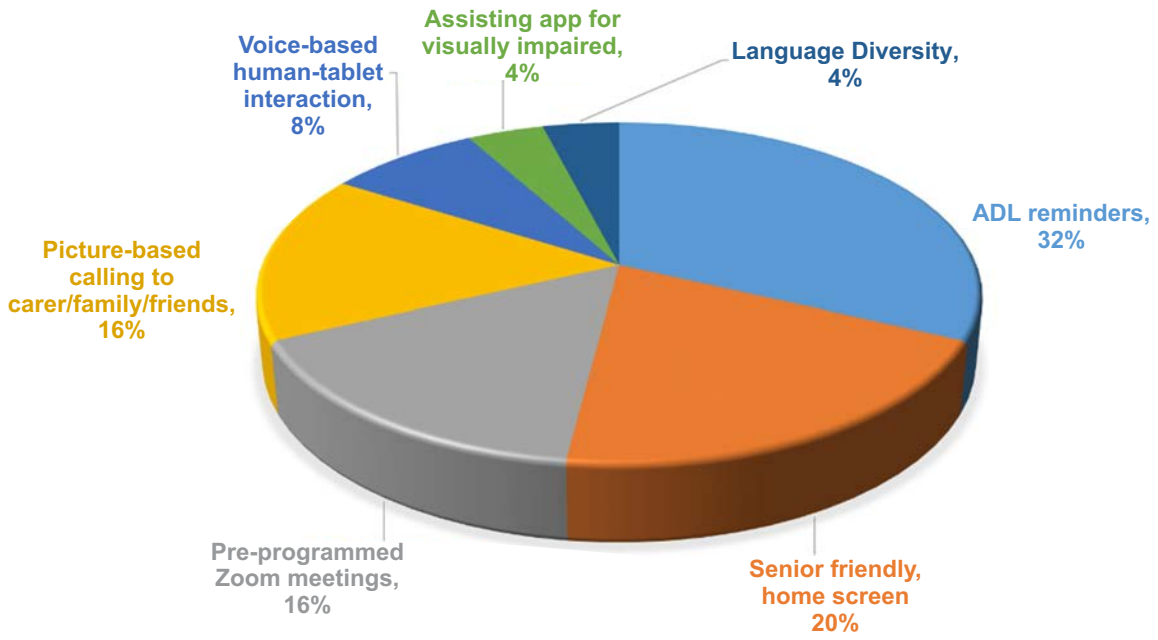
Q17: I/my team was able to help the senior and their carer manage the tablet. (Note: There were 12 respondents. The 2 "not applicable" responses were excluded.)



TABLET DESIGN

Managers were asked about the tablet design, the features they found most useful for seniors living with dementia, and the features that needed improvement. One aspect of the TEHL tablets that stood out for the managers was their customizability; they also very much appreciated that they were co-designed by the people directly involved in their use.

Q19: Which feature did you find especially useful? (Note: There were 12 respondents. ADL = activities of daily living.)



MANAGERS' PERCEPTIONS OF THE DIGITAL KNOWLEDGE AND SKILLS OF SENIORS AND THEIR CARERS

Even with the increased use of technology by older adults,[19] there is still a misperception that older adults are not tech savvy, and that the rapid pace at which new technologies evolve is a barrier. Managers reflected on this in the interviews

> ***We have some 90 year olds who are more adept at learning and taking in this information, as opposed to some 65 year olds who are, nope, nope, I won't have it. I don't want it, I don't want to learn it. So, it's very funny. It actually just depends on the person, and I think their history, if they've seen it before, if they've been around, it before, if they've used technology of any sorts before.***

Another manager spoke about a client living with dementia who had worked in the tech sector. He was very excited to be part of the TEHL research project because of his familiarity with technology. He shared that he knows more about technology than his carer, which is wonderful for his self-esteem and confidence.

With the requirements to shelter in place during the COVID-19 pandemic, most seniors who attended in-person programs at senior-serving organizations found themselves isolated, with no means to connect with friends, family, health-care providers, and the programs they had previously attended, all of which had pivoted to remote delivery. Many seniors also found themselves forced by circumstances to embrace technology with which they had little or no experience.

> ***During COVID they had to work on it. Because they didn't have any other option or any other choice. So they had to learn how to use technology... Before COVID maybe it was impossible. But now I think now they, they accept the reality that they have to move on. So with this era you need to learn how to how to connect with the technology. They just take it on and just move forward.***
>
> ***... some of the seniors, they took computer classes in different organizations that we are partnered with. So, they had computer classes and some digital literacy classes.***

An organization's commitment to innovation and to empowering seniors through technology brought out in seniors a willingness to learn and try their hand at something new. Managers encouraged seniors and worked in partnership with them to learn how the tablets could enhance the quality of their lives and the lives of their carers. As one of the managers observed, the key to success is to introduce the tablet to the senior early in his or her dementia journey. This has the potential to allow clients to remain independent for longer, and it has the potential to reduce the stress levels of seniors and their carers, enabling them to take advantage of more services offered by the organization.

MANAGERS' PERCEPTIONS OF THE HEALTH AND WELL-BEING OF CARERS

Dementia has significant physical, emotional, and financial impacts not only for the people who are diagnosed with the condition, but also for their carers, families, and communities. As a result, the World Health Organization has prioritized supporting dementia carers as a key public health issue. Building the capacity of care providers is also one of the areas of focus for the Public Health Agency of Canada, as highlighted in their 2024 report entitled "A Dementia Strategy for Canada."[20]

In interviews, managers shared feedback from carers who stated that with the tablet they had less work and reduced stress. Those who were caring for a spouse also shared that they were better able to enjoy their spouse's company.

Caring for a person living with dementia has not only challenges and burdens but also positive elements, all of which have an effect on the carer's well-being. In our in-depth interviews with carers, we invited them to discuss both the challenges and the positive elements of caring for a senior living with dementia.

A carer shared with staff at an organization serving seniors living with dementia and their care partners that with the tablet's reminders she doesn't have to "nag" to get her husband to do things. She doesn't have to feel like a "bad wife" and they're able to have more time together where they're just enjoying each other's company.

> ***She said her husband was watching tv and all of a sudden, he got up and she said, what are you doing? And he said, well, the tablet told me it's time to drink water. So, I'm getting up to drink water. And then another night, she said he was going to go do something. And she's like, what are you, what are you going to do? And he said it's time to take garbage out. So, there's things that are happening without me saying it now.***

Another carer noted that her husband enjoys animal videos on YouTube, and they watch them together. She finds that they also help her relax. Another carer noted that the tablet can also act as a distraction, lessening the senior's stress and improving his mood while providing the carer with some personal time.

> ***So, listening to music, it gives him a distraction. If he gets upset, he can listen to music. So, it helps a lot. And if he is playing games on the tablet it also acts as a distraction and gives me some time to relax a bit or do other things.***

One manager described the tablet as "almost a caregiver." She emphasized the potential of the technology to support the well-being of both seniors with dementia and their carers by reducing the workload and stress for carers while improving the quality of life for their loved one with dementia. Another shared that the two couples she talked to were both very positive; both spouses said that after a short time they noticed how much their stress level had gone down and how much the tablet was helping them.

MANAGERS' PERCEPTIONS OF THE HEALTH AND WELL-BEING OF SENIORS WITH DEMENTIA

The approach to treating dementia has evolved: rather than focusing primarily on medical symptoms, there has been a shift toward a more holistic, person-centred model that emphasizes improving quality of life and helping individuals with dementia to live as fully as possible. This change has been influenced, in part, by the voices of seniors living with dementia, who share their experiences and by so doing challenge traditional views of the condition while also raising awareness. With the move toward earlier diagnoses, more stories are emerging from those in the early stages of dementia, offering a more nuanced perspective that challenges the typically negative depiction. This will be explored in greater detail later in this report when we discuss what we heard from the seniors with dementia themselves, who are the end users of the tablet.

> ***Carers have reported that the senior's mood is better since receiving the tablets. They have increased independence with the tablets — they can play music, games, by themselves, they don't have to ask them. It also reminds them about their activities of daily living, and appointments.***

Managers were asked, “In general, would you say the physical and mental health of seniors in your organization is Good? Fair? or Poor?" These are terms commonly used by individuals rating their own health or by people responding to a survey on behalf of another person. They are a simple measure of both physical and mental health status, shaped by an individual's personal experiences, their interactions with health-care providers, and the group they use for comparisons. These terms are used widely in surveys and other research conducted by Statistics Canada, the Public Health Agency of Canada, and the World Health Organization.

> ***Generally, I would say for the seniors we see their health is good because they really focus on their physical and their mental health. And their carers also take care of their physical and mental health. They really work on their stress and anxiety issues. And they have their own daily routine for walking, eating healthy and taking care of their personal hygiene. They take a shower or a bath daily. So, no I wouldn't say that their health is fair to poor. I would say good.***

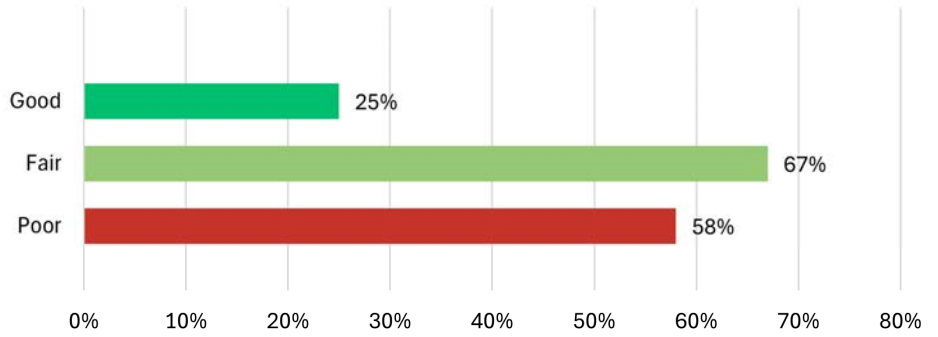
The term “good health” describes the condition of someone with no major health concerns who probably engages in healthy habits like regular exercise, a balanced diet, and good personal hygiene. Their mood is stable, and they feel mentally well adjusted. There are no significant psychological or emotional issues affecting their life and they enjoy social interactions without significant limitations.

The term “poor health” indicates that an individual has substantial health problems that significantly impact their daily life, potentially requiring ongoing medical treatment. Individuals in poor health are experiencing significant health problems or chronic conditions that substantially affect their ability to carry out activities of daily living. They might have conditions that require ongoing management. They may be facing severe emotional or psychological challenges, such as major depression, anxiety disorders, or cognitive issues such as memory loss or dementia that hinder their ability to engage fully in life. The person's health issues may limit their physical activity, social interactions, and overall quality of life. They may struggle to maintain basic routines or self-care.

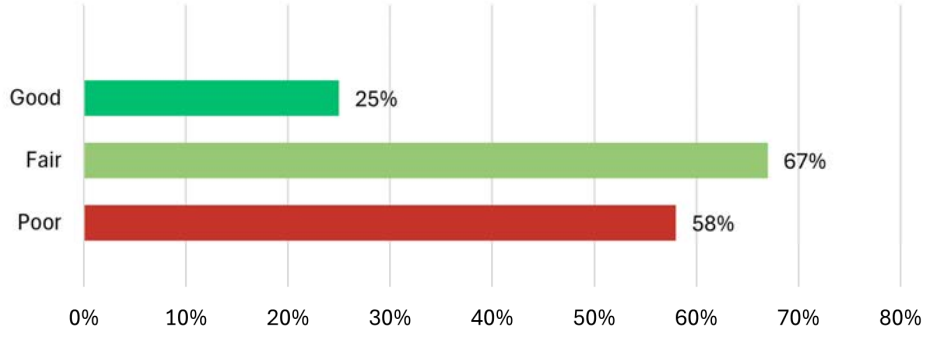
> ***A lot of our clients tend to have dementia or mild cognitive impairment (MCI). And then the care partners of the people living with dementia often have problems that impact their ability to do things. So sometimes that's mobility issues, or mental health problems like anxiety or depression. So a good number of seniors and carers do have multiple health problems.***

What follows are statistics from the managers regarding the overall health status of seniors in their organization. The percentages do not add up to 100% because managers could select more than one answer. They perceived the seniors in their organization to be at different levels of physical and mental health, with most falling in the fair to poor range.

Q8: Physical health status (Note: There were 12 respondents.)



Q8: Mental health status (Note: There were 12 respondents.)



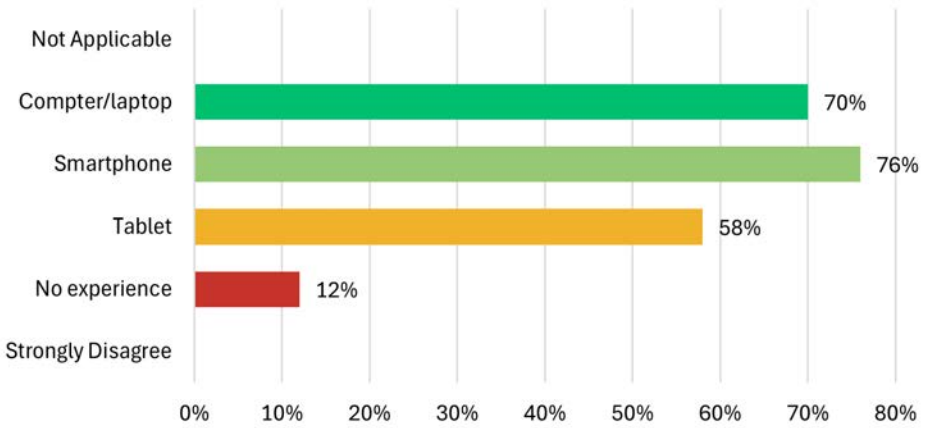
IN THE VOICES
OF THE CARERS

DIGITAL LITERACY AND IMPROVEMENT IN TECHNOLOGY SKILLS AND KNOWLEDGE

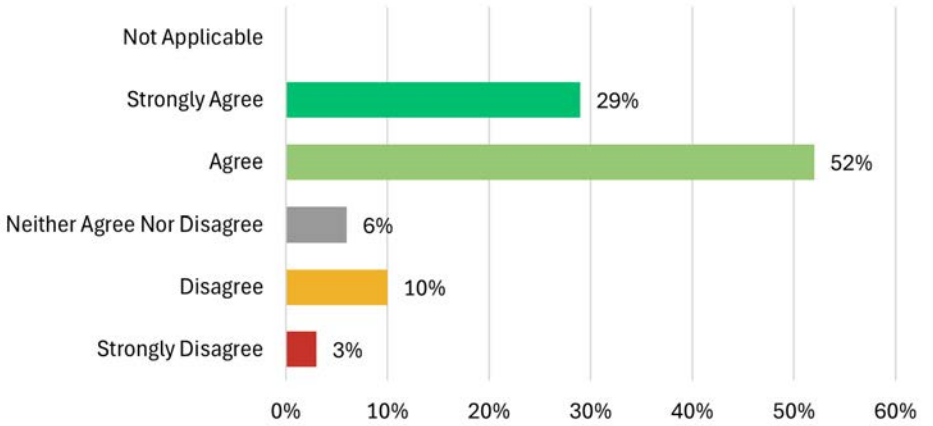
The focus in this section and the next one is on digital literacy, improvement in the carers' technology knowledge and skills, tablet training and technical support, and the tablet's features.

The literature on care for people living with dementia indicates that there is an important role for technology in both lessening the “burden of care” to which Cunningham and others refer and enhancing the quality of life of both the person living with dementia and the person caring for them. In the surveys and interviews in our study, carers shared their previous experiences with technology and discussed how their knowledge and skills improved with their use of the tablet. They also commented on the improvement in the seniors' use of the tablet and the impact it had on their quality of life. What will be apparent from the comments that follow is the ease with which carers were able to navigate the tablet. Their positive experience in learning to use the tablet indicates improved digital literacy. Our findings also show that they were aware when they need additional help, which is another important aspect of digital literacy.

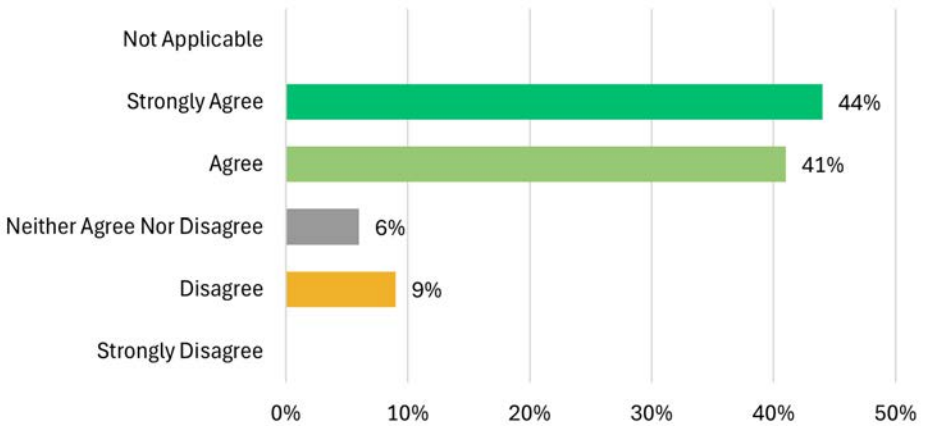
Q6: : I have had previous experience using digital technology such as computer, smartphone, tablet etc. (Select all that apply.) (Note: There were 33 respondents.)



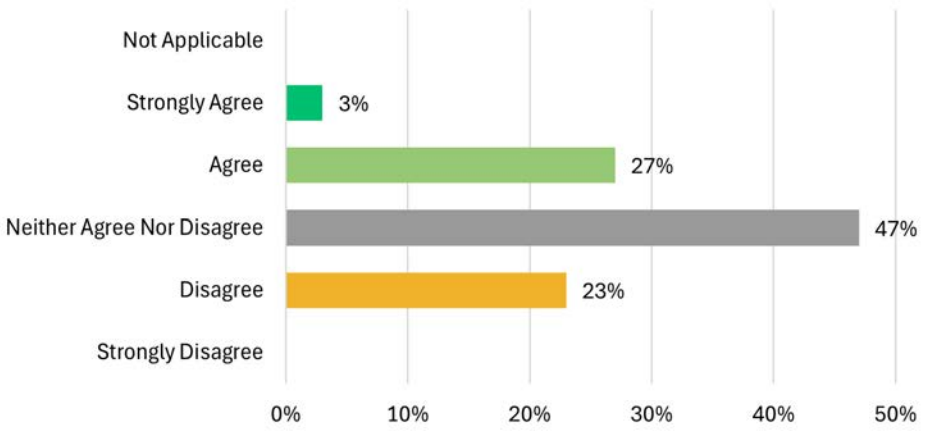
Q7: I am able to independently perform tasks with digital technology (e.g., computer, smartphone, tablet). (Note: There were 32 respondents. The 1 "not applicable" response was excluded.)



Q8: : I am willing to use digital technology (e.g., computer, smartphone, tablet) in my daily life. (Note: There were 32 respondents.)



Q9: Since the senior and I have used the tablet, I have increased my knowledge of and my skills with digital technology. (Note: There were 32 respondents. The 2 "not applicable" responses were excluded.)



Improvement in knowledge of and skills with digital technology was most significant for those carers who indicated that they or their loved ones were previously "not very techy" or not "tech savvy."

> ***Both my husband and I are not very techy at all but my husband likes to play solitaire, so he plays it on the tablet and he likes YouTube. He can open the tablet, start it and he can close it. Oh, and the camera we've used that too and the calendar reminders. Very easy. My mother is not the most tech savvy person. So, with something new she is always oh, that's a new thing. I don't know what to do. Like, no, thank you. And so, I said no, no, it has games. You like games. That's how I enticed her into it.***

Where the carer or senior felt that they already had sufficient skills to manage the tablet independently, improvement was less significant for them.

> ***What I say to people is that my husband has forgotten more about technology than you have ever learned because of his years of experience working in IT. And where we came from, we came from the old computers that filled the room, and we had to do key punch cards.***
>
> ***For me it's nothing new because it's like my smartphone kind of like that. So, for me I'm using my smartphone and my computer. So, for me it's okay. It's been easy to use and easy to learn.***

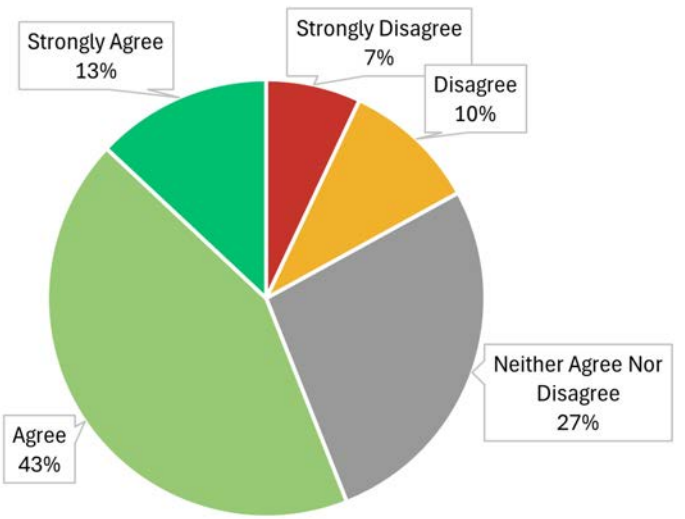
A carer also shared how her father was able to play games on the tablet, specifically he had success playing connect the dots, which enabled him to progress to the next level. This indicated to the carer both cognitive improvement as well as an increased ability to interact with digital technology. The carer stated that her father's success made her “happy.” She also shared that before he had the tablet, keeping him occupied and stimulated was a challenge. Now he enjoys using the tablet and playing those games and when they make video calls, he sits and talks with the family. His wife uses the tablet as well. The carer remarked on how the tablet's one-click YouTube feature made her mother's life less stressful and more enjoyable.

> ***My mom has trouble with the TV remote, channels. It was not easy for my Mom. But with the tablet it's easy just click on YouTube and the screen is coming. So, she's watching YouTube now on the tablet. Last week she was sitting and watching YouTube on the iPad. I said, yeah, that's a good thing. It's easy for you. You are sitting and it's in your comfort zone. You don't need to stand up or look for the remote and she said it's convenient to watch videos on YouTube.***

As expected, there was a learning curve and there were challenges in adapting to a new platform, but overall, the tablet was easy for seniors to operate and with training and ongoing technical support both carers and seniors were able to use the tablet successfully.

Q17: The tablet is easy for the senior to operate and manage.

(Note: There were 33 respondents. The 3 “not applicable” responses were excluded.)

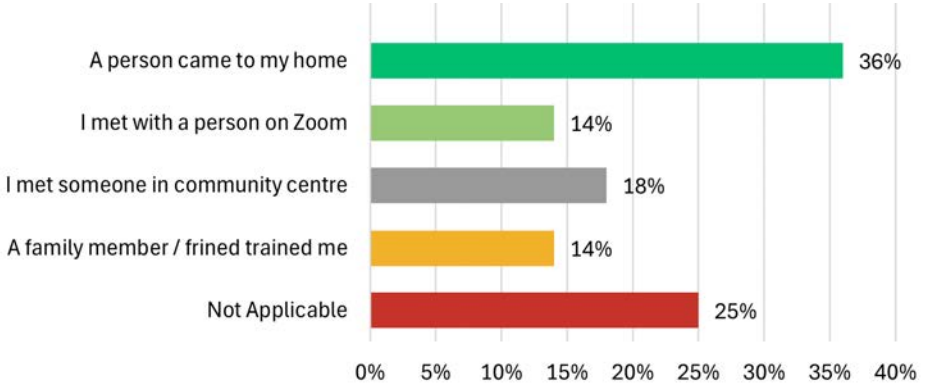


TABLET TRAINING, TECHNICAL SUPPORT, AND TABLET FEATURES

Sixty-five percent of carers either strongly agreed or agreed that they had received sufficient training either in their own home, on Zoom, or at the community centre they attended. One carer commented that after receiving training, she was able to edit the tablet's calendar and reminder features. The carer's improvement in digital literacy as she learned how to not only navigate but also edit reminders on the tablet demonstrates her increased competence in using the tablet. It also demonstrates an openness to learning.

> ***After the training, when Human Endeavour put in the reminders for activities of daily living, I explored them all. Then I removed one because it was in there twice. The same thing was twice. So, I removed one of them. It was very easy. It was ok, it worked ok.***

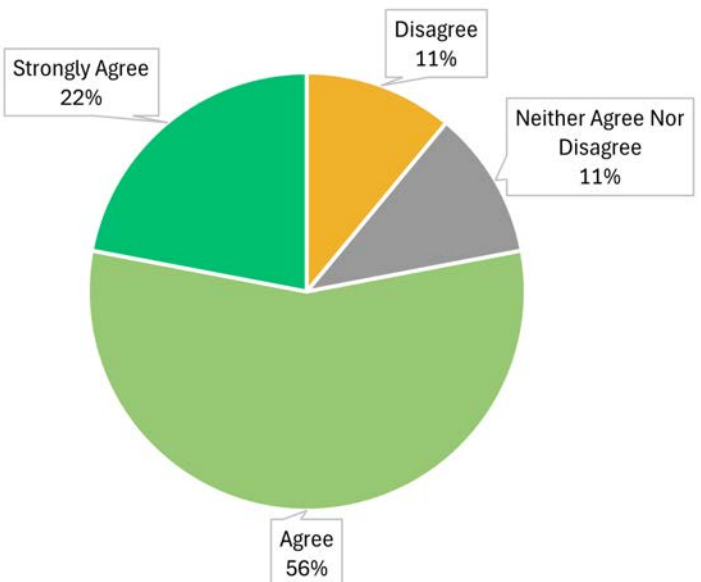
Q11: How were you trained to use the tablet? (Select all that apply.)
(Note: There were 28 respondents.)



Carers shared that the training provided for using the TEHL tablet was helpful in addressing their questions, providing guidance, and resolving issues. They mentioned the usefulness of the support system and the availability of the team for training and troubleshooting. They expressed appreciation for the support team and their responsiveness in solving problems.

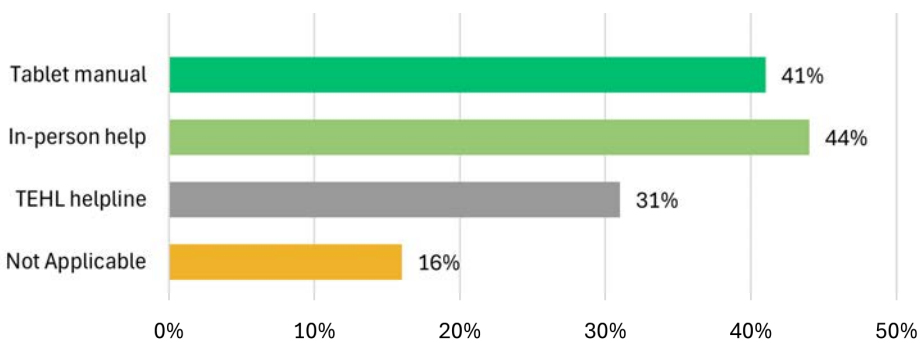
Q10: I received sufficient training on the TEHL tablet.

(Note: There were 33 respondents. The 6 "not applicable" responses were excluded.)



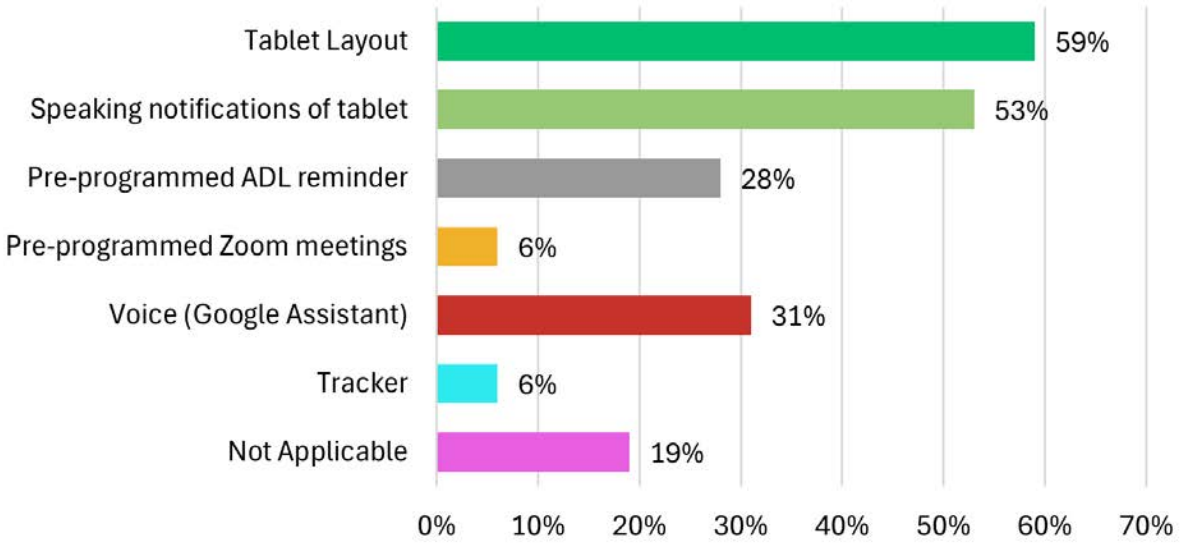
Q12: What kind of technical support do you find most helpful? (Select all that apply.)

(Note: There were 32 respondents.)

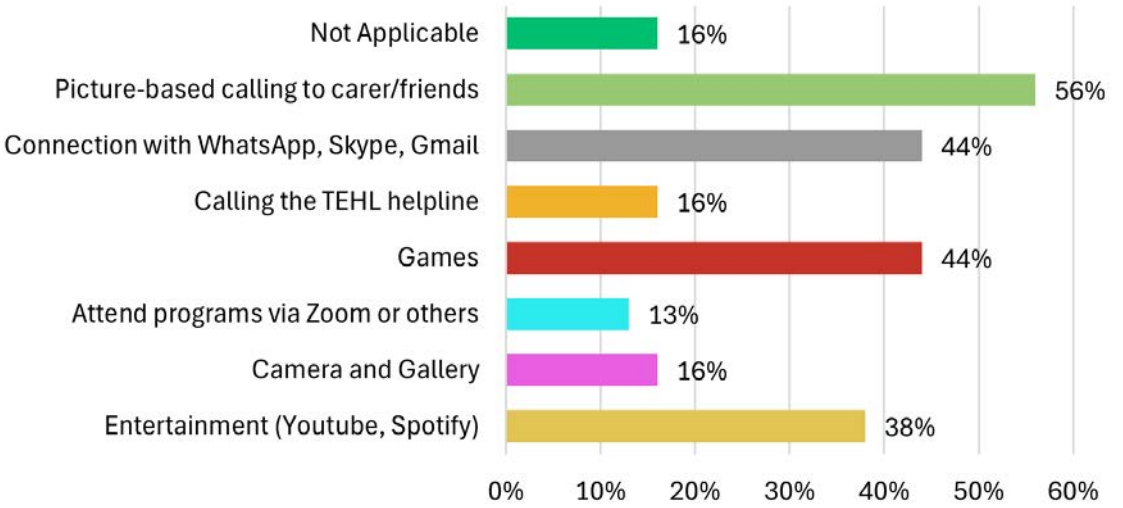


> *I appreciate your service. Whenever I ask about a problem and you send someone, you solve my problem. Thank you very much. Because since last year, close to Christmas and this year, New Year, Chinese New Year, I turned off the tablet because it didn't work. And so you reminded me there is a reminder I have to charge.*
> *And it's good to have the manual. Me personally I'm getting close to 72, it's sometimes nicer to have it on paper than to try and look for information on the screen. You can flip through it as you need to. So, I personally appreciate having the paper manual.*
> *I found that the actual physical manual is most helpful because my mom has caregivers that I have coming in during the week when I'm working. So, I was able to leave the manual there so that they could also help her with the tablet. Even if she were to do training, she's not going to be able to retain it. I like having the physical book and like picture instructions for things too. So having that manual there that her caregivers could kind of go through and double check things is great.*

Q13: What design features of the TEHL tablet do you find most useful for the senior? (Select all that apply.) (Note: There were 32 respondents. ADL = activities of daily living.)



Q14: What apps of the TEHL tablet do you find most useful for the senior? (Select all that apply.) (Note: There were 32 respondents.)



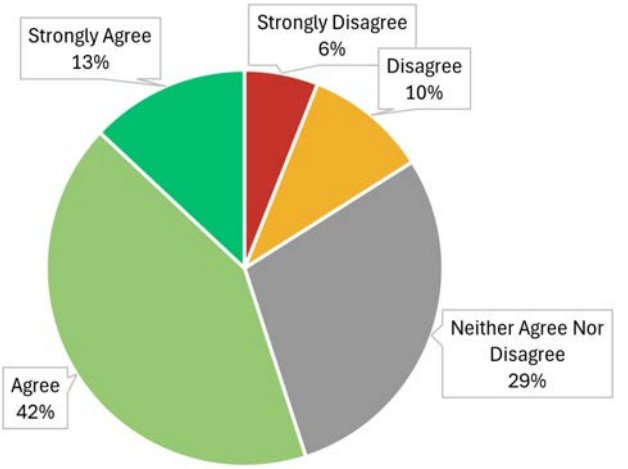
THE HEALTH AND WELL-BEING OF CARERS AND THEIR PERCEPTIONS OF THE HEALTH AND WELL-BEING OF THEIR LOVED ONE WITH DEMENTIA

Researchers addressing the demands of dementia-specific caregiving compared with non-dementia caregiving found that people caring for someone living with dementia were more likely to report worse physical health outcomes and a greater risk of anxiety and depression than those caring for someone without dementia.[21,22]

Parker and colleagues noted that the demands of assisting seniors who required help with activities of daily living was a significant source of stress.[22] With this in mind, the tablet's reminders to seniors with dementia that it is time to attend to an activity of daily living are very important. Each time a senior completes a high-priority activity of daily living, their carer receives a confirmation message. If the task is not completed, the carer is notified via an auto email or text. As one carer said, she no longer must be the "bad wife" constantly reminding her husband to do this or that.

It is difficult to separate the carer's health and well-being from the senior's health and well-being because they are so interconnected. For this reason, in this section we will report on both carers' well-being and their perceptions of the well-being of the seniors for whom they cared.

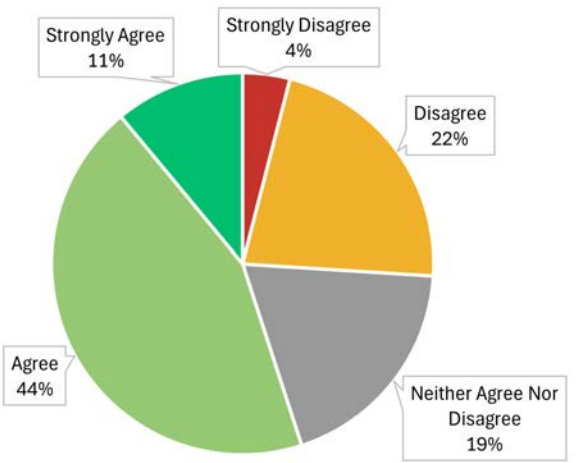
Q21: The tablet helps the senior live more independently than before because it helps him/her perform daily tasks more easily. (Note: There were 33 respondents. The 2 "not applicable" responses were excluded.)



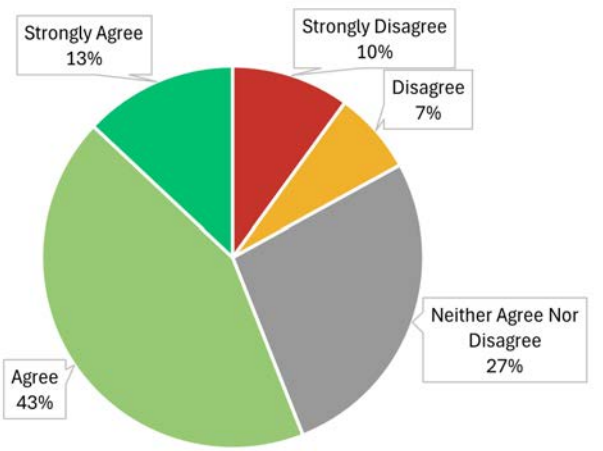
The following comments highlight the multiple positive uses of the tablet for both the seniors with dementia and their carers, with an emphasis on the medication reminders. Carers expressed how the tablet makes managing medications easier.

> ***My mother has had a couple of strokes. So, the tablet comes in handy for two things. One is a reminder to take her medication and the other to go down to bingo. And at Bingo she gets food, bingo probably saved her because I didn't realize how little she was eating. So, the reminder about Bingo is very important. Also, sometimes when she's had a bad day, I know the one time her phone died because she forgot to plug her phone in, and I was able to reach her through the tablet by calling her. And she was able to call me on the tablet, you know, even when her phone was dead. So. I was really happy that she had it...***
>
> ***Lots of things on the tablet help me. For example, the tablet tells me and my husband when to take his tablets. I sometimes forget but I have the tablet. So, I can remind him what time he needs to take them. He has six different kinds of tablets from the doctor so it's hard for me. I think with the tablet to remind me, it's easier for me. That's the main point.***
>
> ***The reminder to take medicine, vey important. That's why, you know, he has to take lots of medicines, so if he miss any it is very risky. So that's why. Yeah, he requested tablet, you know, and it is helping him a lot. Yeah. Because with the help of tablet, he doesn't forget to take his medicine regularly.***

Q26: The senior's health behaviours (e.g., taking medication, drinking water, eating regular meals) have improved. (Note: There were 33 respondents. The 6 "not applicable" responses were excluded.)



Q18: The tablet helps the senior perform daily tasks more easily and makes their life more comfortable. (Note: There were 32 respondents. The 2 "not applicable" responses were excluded.)



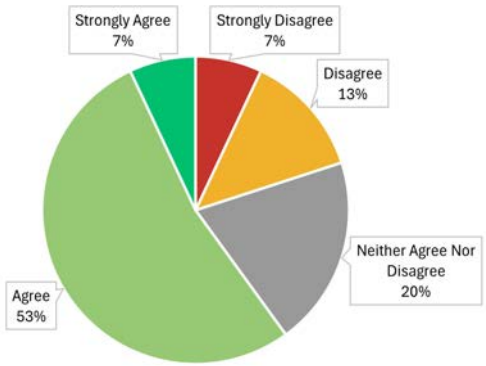
> ***Yes, the tablet helps. It's actually, helpful. As we all know helping a senior or having parents with dementia is not easy and if somebody's working, I'm working full time and I'm taking care of my father and I, of course I have my own family. So this [tablet] is like a good hand to help me. Yeah, it's a helpful device.***

The phrase "**a good hand to help me**" indicates that the tablet eases the caregiving burden. The tablet had a positive impact on the overall well-being of the senior; when a senior's well-being improves, it has in turn a positive impact on their carer, as noted by Hazzan and colleagues.[7] Approximately 55% of carers either strongly agreed or agreed that the senior's quality of life had improved with the tablet (Q27), while 36% of carers either strongly agreed or agreed that their own quality of life had improved (Q34). Even small improvements in the demands on carers are significant.

> ***Life, it's better for me. I think it is better for me and for him...This tablet really helped me. Without this tablet it's up to me. I have to handle everything. And we have arguments. I always forget things. Sometimes I forget to feed him, and I like to take a nap too. So if I don't feed him, he doesn't eat. So if I have the tablet to call me when it's time it's very good. So now he is just quiet because he is happy now. Yeah, he has food to eat. He has all the things to eat. And I'm happy, less arguments.***

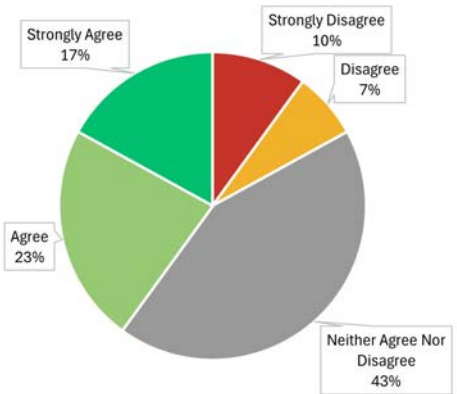
Q27: The senior's quality of life has improved by having this tablet.

(Note: There were 33 respondents. The 3 "not applicable" responses were excluded.)



Q34: Your quality of life has improved by having this tablet.

(Note: There were 33 respondents. The 3 "not applicable" responses were excluded.)



For carers, care demands are not only physical. As Freedman and colleagues' research makes clear, there is also an impact on the carers' emotional well-being.[21] This quote illustrates the impact on a daughter's emotional health of caring for her father before her family received the tablet. It highlights the constant worry and stress the daughter was experiencing about her father's well-being, including concerns about their daily activities and the need to "run" to check on them.

> ***Sometimes I would trying calling them. If they were not reachable I had no idea, what's happening, I have to run, right? And like if are they getting their meal on time? Are they okay? Like are they awake, are they sleeping? What's happening? Now the tablet is giving me a reminder, even if I'm busy the message comes to my phone, and I know my mother's there, and they are doing well.***

And this quote makes clear the positive impact of the tablet on a carer's emotional well-being. As she says, it gives her "peace of mind."

> ***It's helpful totally. Like, emotionally, like it's peace of mind. Life is technology nowadays. We rely on this because when I call my parents, they immediately answer me. I get a quicker response than the regular phone because when I call them, and they see me they see my name is there so they answer.***

The following quote from a carer shows how the tablet helps lessen conflicts by keeping their loved one with dementia occupied, thus reducing the number of repeated questions that lead to arguments.

> ***Sometimes my husband asks these you know, questions, he does kind of nonsense talk. Maybe he forgets something and asks me 10 times and I become angry. If I give him the tablet, he's busy. He doesn't ask me any questions.***

As one carer expressed it, ***"For the last couple of years it's been all about what is happening with my husband and what can I do for him. You know, you're the one responsible for that person and you don't seem to do as much for yourself."***

She went on to explain that her husband worries when she leaves; he seems unable to remember or process written or verbal reminders about where she is going and when she will be back. As a result he becomes highly anxious as does his wife, because having to calm her husband down after she returns places a strain on their relationship.

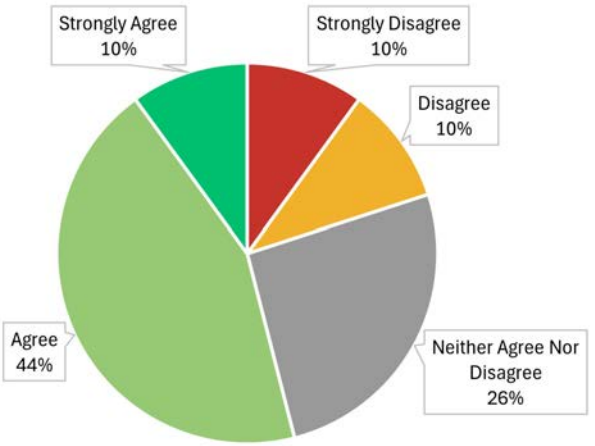
> ***I'd like to go out and the anxiety from my husband wouldn't be there when I come back or not as much. It would help if I could leave him with the tablet, and he could just relax and if he is worried he could just click my picture and call me. He would connect right away with me. He needs to learn that so I can enjoy shopping or enjoy a meeting or meet with a good friend up the street and go for a walk in the morning. So it would be nice to be able to do that more and not have to worry that my husband is anxious about where I am and when I will be back.***

Overall the feedback from carers was that the auditory cues of the tablet catch the attention of seniors with dementia, enable the seniors to follow their routine more independently and remember important activities without constant reminders from their carer. The device acts as a "friend." This lifts the senior's mood and lessens the carer's stress, which in turn lifts the carer's mood.

> ***Talking makes a big difference. The tablet talks. It's like a friend for him. That's something he didn't have before the tablet.***

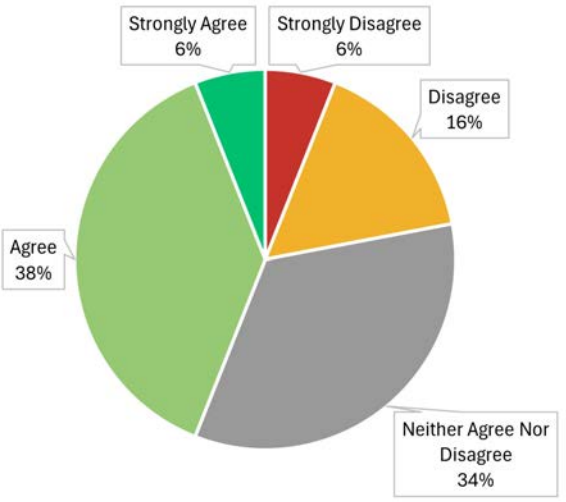
Q19: The tablet lifts the senior's mood.

(Note: There were 33 respondents. The 2 "not applicable" responses were excluded.)



Q31: The tablet lifts your mood (the carer's mood).

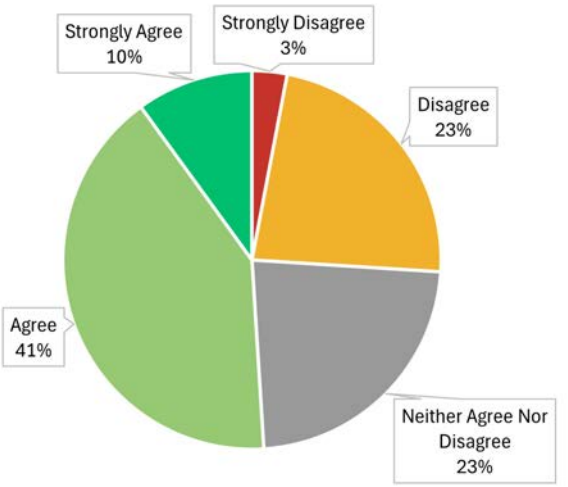
(Note: There were 33 respondents. The 1 "not applicable" response was excluded



> *Of course, yes, we see changes in his mood when he's able to make video calls and talk to his family over the tablet. He feels much happier. And sometimes he remembers things. When he talks normally, he doesn't talk that much. Like he's quiet. But when he sits on the screen and somebody asks questions, then he repeats, and he remembers. He tries to remember and yeah, that's, that's a good improvement. I'm very happy. Whenever the tablet is on, he is in a very good mood, especially after lunch, and three hours again after dinner. He stays for two, three hours again. So, it is really good for him. You know, if your mind is good, then your health will be good.*
>
> *He has been using it for entertainment like music and news. And sometimes phone, as well. And he's been listening to the Quran as well with it. When the tablet is on, he's very happy. Sometimes he doesn't want to close it even when it's time to go to bed.*

Q28: The tablet lessens your stress and your care responsibilities. (Note: There were 33 respondents.

(Note: There were 33 respondents. The 2 "not applicable" responses were excluded.)



The following quotes illustrate how the tablet indirectly improves the well-being of seniors with dementia by giving their carers more time for self-care activities.

> *My father is busy on the tablet, so she [my mother] does light cooking for herself, she takes her time, and she does a workout inside the building, so she's walking and taking care of her health. Yeah, it's really helpful for her.*
>
> *You know when I think he can take care of himself, I'm not worried about too much, so at least, I can take my medicine in time. I, I have like a high blood pressure. I am also diabetic. But yeah, not too much, you know, like it is okay right now. But they said every three months you have a diabetic test. And I have to manage all the, you know, my responsibilities and I have to manage my work also and pick and drop for my kids.*

PROTECTIVE FACTORS

It is important for both carers and seniors living with dementia to have opportunities for social connection. Maintaining connections with family and friends through picture caller ID phone calls, WhatsApp, and video calls as well as in-person visits contributes to social inclusion and reduces isolation for both carers and people with dementia. The tablet facilitates easier communication between carers and their loved ones, maintaining connections and again reducing isolation. The Zoom feature enables carers to take advantage of day centre programs and support groups offered by community organizations.

> ***So, there is an adult day program through Zoom. I sent her the link the other day and I asked her to click and join. It was not easy the first time, but yeah, she did it and she attended the adult day program. I think it was a singing program. So later when I asked her, she said, yeah, I was able to participate. Because she's the one who has to stay with my dad and care for him at home she cannot attend in person. It's a good help.***

One carer spoke of her mother's desire, as carer for her father, for social inclusion and the potential for regular programs to help her stay engaged, busy, and socially connected, which could reduce her isolation. Many carers for seniors living with dementia are seniors themselves and many have health issues of their own, complicating an already complex situation.

> ***My mom has high blood pressure, and she is using insulin for her diabetes. She also needs care. She's always complaining about pain and all that stuff. It's an age thing. But yeah, like the main thing I see for her is to keep busy. So she, she loved going out. She loved to join the programs. She loved to see people. But the only reason she has to stay home is because of my dad. If we could find a regular program on Zoom maybe three times a week or two times a week or even once a week that continues it will happen. So it will keep her busy and focused on the class and it's good for her memory. Something to hear, to watch. That would be helpful. Okay.***

In-person and Zoom meetings to provide support for spouses caring for a loved one with dementia further reduce isolation and offer carers the emotional and social support they need.

> ***Through the Alzheimer's Society I went to meetings for the spouses of people living with dementia. We sat around and discussed. It was called spousal support. We sat around and talked. So you can see what's ahead because some of the ones there their husbands were in long term care already so you see, you find out what you can deal with. And then there was another one which was a walk program in the summertime. We went on the walk. He thoroughly enjoyed that.***

The tablet's YouTube feature helps the carer and the senior for whom they are caring maintain connections with familiar content in their own language, reducing isolation by providing not only entertainment but also a cultural connection.

> ***The things she used to watch back home are all on YouTube nowadays, so it is easy for her to scroll and see what she wants. Then she clicks and all the program comes up easily. That is easy for her.***

For one carer the tablet made her husband “like life.” He'd keep up with current events, which allowed him to engage with information, engage in conversations, and stay connected to the world. Through the tablet he maintained a sense of involvement in life.

> ***Whenever he is watching, he's very happy. He's very happy. It makes him like life. He knows everything, everything that is going on. More than me. He remembers something, he was telling me something. Sometimes he forgets because of his dementia. But when he realized something, he'd comment. So, I think he's doing well you know. He enjoys the tablet very much. For us the tablet is like company.***

In addition to support for activities of daily living, entertainment, cognitive stimulation and social connection, the tablet provides both carers and seniors with a sense of security and “peace of mind.” One carer explicitly stated that she is feeling happier, stronger, and safer because of the tablet's ability to call for help. She feels an increased sense of security.

> ***I feel happier, of course. I'm strong because I have the tablet on my side. When I feel in danger, I can call for help. Everything is safe to me, I feel safer now. The tablet is just like a good friend beside you, on your side. [in certain situations, both senior and carer are using the same tablet]***
>
> ***Before I had the tablet, I'd have to make a point of calling [my loved one to remind them to do] certain things, you know. And so, it just added an extra something that I had to remember to do at a certain time. Having the tablet reminders made it easier because I didn't have to drop everything and call. So, it definitely made my life a lot easier because I didn't have to remember every minute detail, did they have water at 9:30, Ensure at 10:30. Like it was too much before.***

IN THE VOICES
OF THE SENIORS

THE INTERVIEW PROCESS

We have elected to include in this evaluation report observations regarding the interview process itself. Consistent with the approach van Corven and colleagues discuss in their article "Defining Empowerment for Older People Living with Dementia from Multiple Perspectives: A Qualitative Study,"[23] the TEHL evaluation interviews with seniors with dementia were designed to be both dementia friendly and empowering for the seniors. The structure of the interviews allowed the seniors to feel heard and valued as important members of the research team. It also gave them a sense of control over the interview, allowing them to highlight their resilience, coping strategies, fears, challenges, improvements over time, and sense of humour. This meant, of course, that the information a senior wished to share about the tablet or about their experience living with dementia sometimes took priority over the questions the interviewer had prepared. This approach set a warm and welcoming tone for the interview and led to unexpected yet insightful responses, enriching the overall findings of the study.

In a Zoom interview, one senior invited the interviewer to see the small desk robot that he owns. He walked to his bedroom so the interviewer could meet the robot. He told the interviewer that it walks around and interacts with him. The senior seemed to view the robot, called LOOI, as a playful companion and it appeared to help keep his mind active. He mentioned using gadgets like this regularly to improve his mental engagement. When the interviewer suggested "LOOI" was like a friend, the senior responded yes and pointed to all the technology he has and said he has "many [friends]." He agreed, though, that not everyone has these gadgets and so he recommended that the tablet be more interactive, that like "LOOI" it be able to have a conversation, not just answer questions. This would better address loneliness, he suggested, given that "people generally live alone in this age, like me, I'm 75."

> ***"It [the tablet] should be like a companion to spend time with each other. The tablet reminders are very good. They're personalized and yeah they help me a lot and other people also, especially for medicines. I forgot every time. Actually last June I got a massive heart attack. After that it was necessary to take medicines on time. Actually dementia for me is from a long time. There was a time I was not able to complete a sentence. And now I'm recovering a lot. But the Google Assist is a basic thing. I'm looking like chat GPT something in the tablet, like an AI assistant talking. He should talk back to me, general talk, not like Google Assistant."***

In another interview the senior and the carer gave the impression that the tablet meant much more to them than just a machine and the interview was about much more than apps and tablet performance. For them the tablet meant independence and companionship at a very challenging time in their life. It was like a family member to them. They even had a name for the tablet.

> ***It [the tablet] has become a member of the family. It's the Rat. There's a little shelf I have to build for him. For a bed.***

The carer then added that if the senior doesn't take his medication when the tablet reminds him, “it rats him out” when he doesn't answer, and she gets told. To which the senior responded, “Yeah the tablet's supposed to be on my side and it's getting her.” When the interviewer responded that it was really on his side, it was caring for him, reminding him to take his medication, the senior said “Yeah, yeah, yeah, yeah. I just say he's a Rat Bastard (RB).” The conversation went on a bit longer, with the senior expressing the hope that RB doesn't have the capability of listening in to any of his connections.

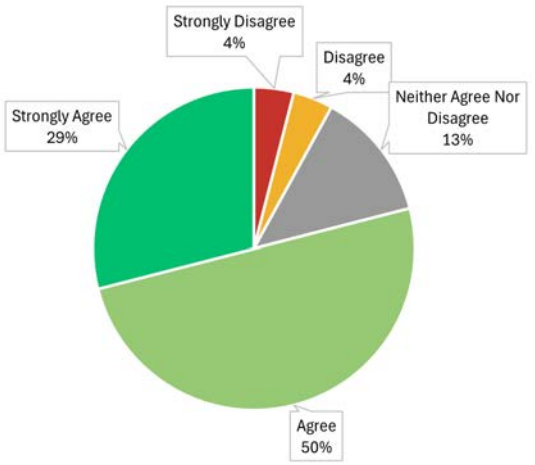
SENIORS' OVERALL USE OF THE TABLET

It is clear from the results of both the interviews and the survey that the tablet was easy to operate and performed well. Seventy-nine percent of seniors either strongly agreed or agreed that the tablet met their needs (Q12), and 71% either strongly agreed or agreed that the tablet helped them remember to perform daily tasks (Q14). As one user said,

Yeah, the dementia tablet is very good for me, it is helpful for me. I am using it the last few months and it support me in my practical life. A lot of problems are solved with the help of this tablet. I am very thankful to you for this. I have a memory problem so lot of things I forget in my practical life especially I forget my medicines; time of the medicine and I forget eating and lot of things this tablet reminds me and right way I take the medicine. Yeah, and also, it helps with entertainment so when I am sad, I use the tablet and good programs I watch and it is a very good entertainment for the old peoples, yes for everybody. It is very good also because the tablet gives reminders to me in my own language Urdu so it remind me in Urdu language. That is very helpful. I feel that a very close person is reminding me to take my medicine, eat lunch, and about the doctor's appointment sometimes so very helpful.

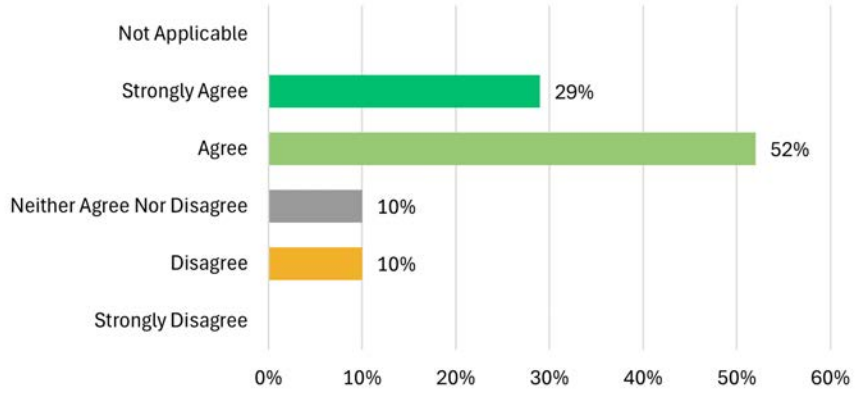
Q12: I find the TEHL tablet useful. It meets my needs.

(Note: There were 24 respondents.)



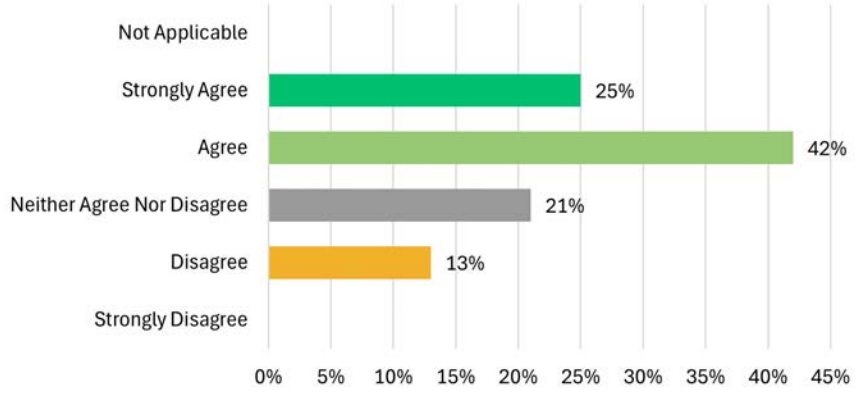
Q14: I find that the TEHL tablet helps me perform daily tasks more effectively (for example: taking medication, eating, drinking water etc.).

(Note: There were 24 respondents. The 3 "not applicable" responses were excluded.)



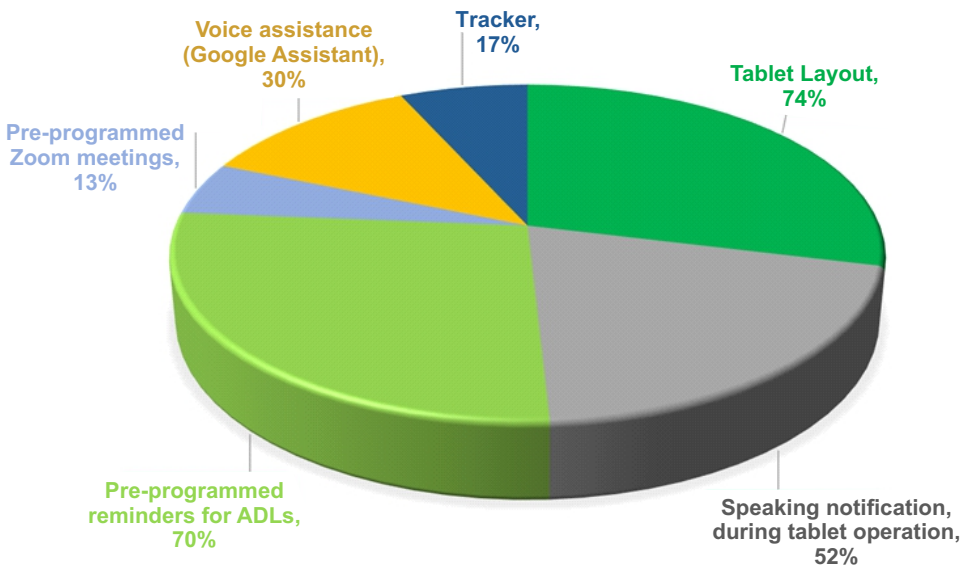
Q13: I find the TEHL tablet easy to operate.

(Note: There were 24 respondents.)



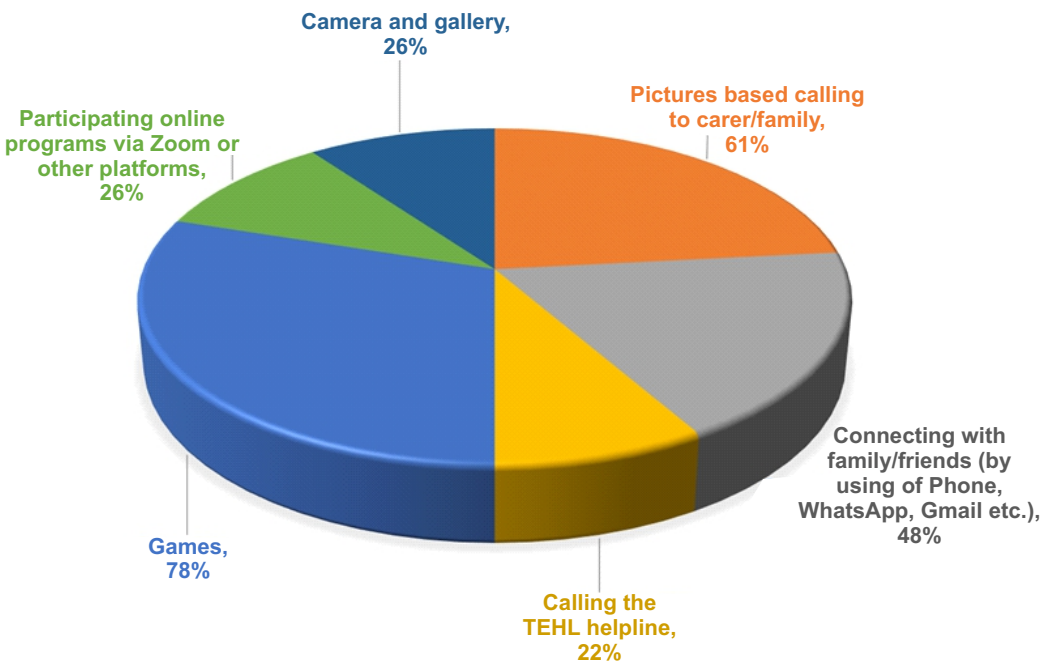
Q10: Which design features of the TEHL tablet do you find most useful? (Select all that apply.)

(Note: There were 23 respondents. The 1 "not applicable" response was excluded.)



Q11: What apps of the TEHL tablet do you find most useful? (Select all that apply.)

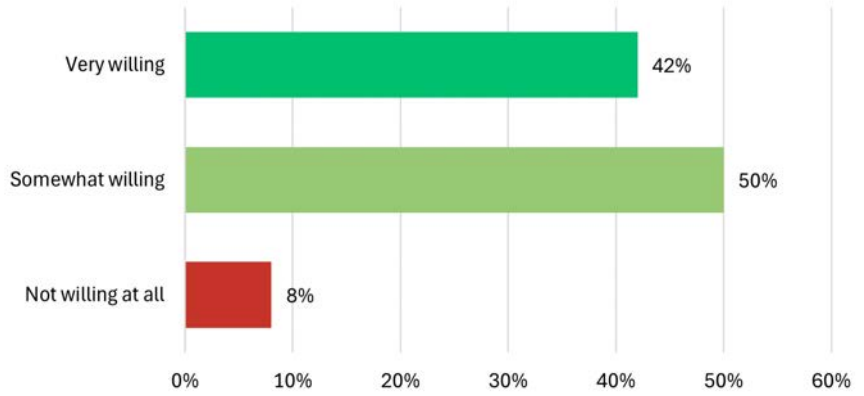
(Note: There were 23 respondents. The 3 "not applicable" responses were excluded.)



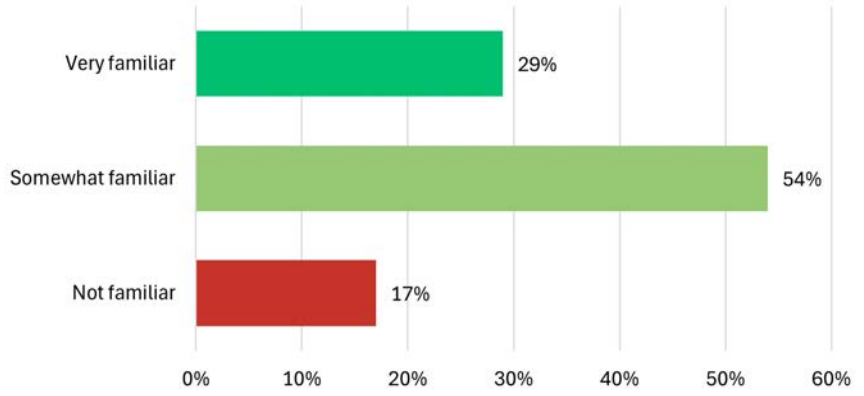
DIGITAL LITERACY AND IMPROVEMENT IN TECHNOLOGY SKILLS AND KNOWLEDGE

While seniors mentioned experiencing some initial challenges in learning to use the tablet, 91% were either very willing or somewhat willing to use digital technology, despite having varying levels of digital literacy before receiving the tablet.

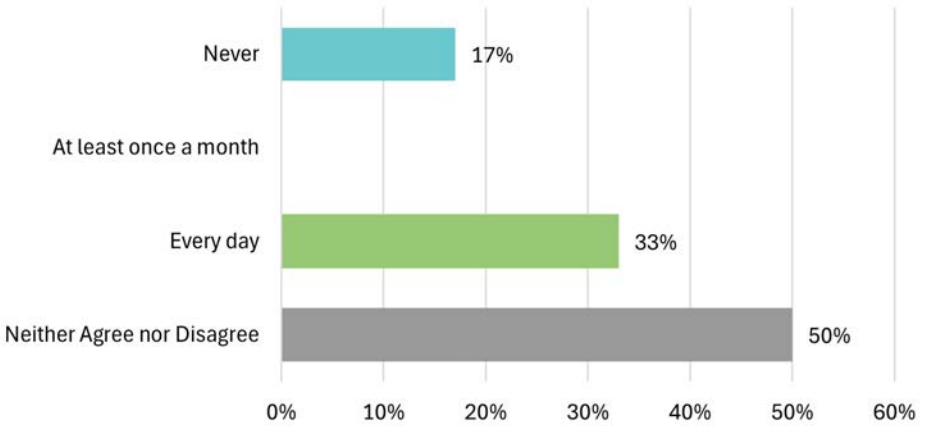
Q7: How would you rate your willingness to use digital technology (e.g. computer, smartphone, tablet) in your daily life?
(Note: There were 24 respondents.)



Q3: BEFORE you had the TEHL tablet how would you rate your level of experience using digital technology such as a computer, smartphone, tablet, etc.?
(Note: There were 24 respondents.)

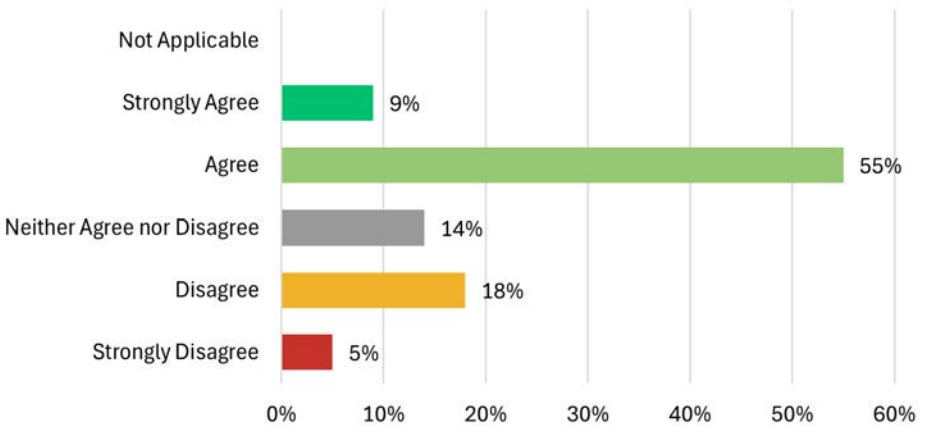


Q5: BEFORE you received the TEHL tablet, how often did you use digital technology such as a computer, smartphone, tablet, etc.?
(Note: There were 24 respondents.)



Seniors indicated that their skills improved with time as they grew more comfortable with the tablet, with 64% either strongly agreeing or agreeing that they had increased their digital knowledge and skills (Q8).

Q5: Since I received the tablet, I have increased my knowledge and skills with digital technology (e.g., tablet, computer, phone, communicating by email, browsing the internet, searching/Googling, etc.).
(Note: There were 24 respondents. The 2 "not applicable" responses were excluded.)



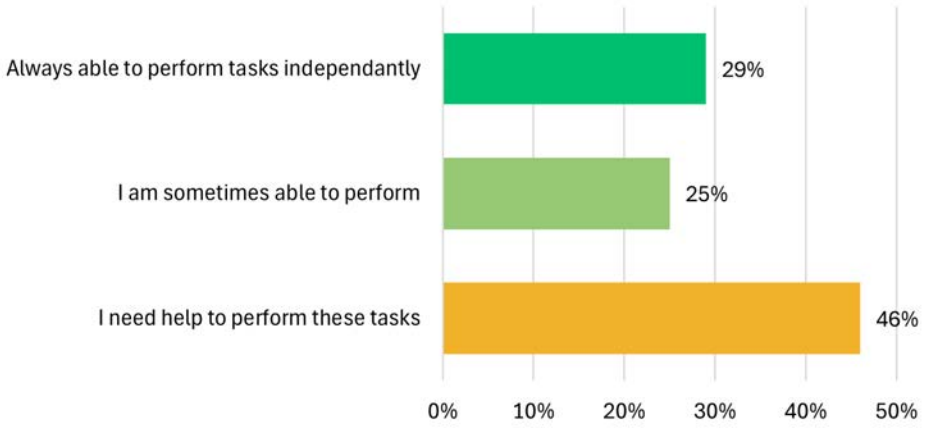
One senior demonstrated improved digital skills as he used the tablet for an increasing number of purposes including seeking information, keeping up with current events, listening to music, playing games, and responding to reminders. Another used various applications such as Google for information gathering, YouTube for entertainment, and games for mental stimulation. He also took the tablet with him when he went out.

> ***Yeah, a lot of things I learned with the help of this tablet, I use Google a lot of new things it introduced me a lot of good things come in my mind. Sometimes when I want to go to my past, I watch the old things on YouTube. And games, for my mind. So, it is a very good thing. Oh, and also when I travel outside it is with me when I go outside, I take it with me.***

One senior showed progress in learning to use the tablet's camera feature, indicating potential for further skill development in this area. With support from his worker, this senior learned how to create a video of his cat, which he subsequently shared with everyone at his program.
It was to be expected that some seniors would report that they needed assistance to perform certain tasks on the tablet. Importantly, they were willing to seek help to benefit more fully from the tablet's features.

Q5: How would you rate your ability to independently perform tasks with digital technology, such as communicating by email, browsing the internet, searching/Googling.

(Note: There were 24 respondents.)

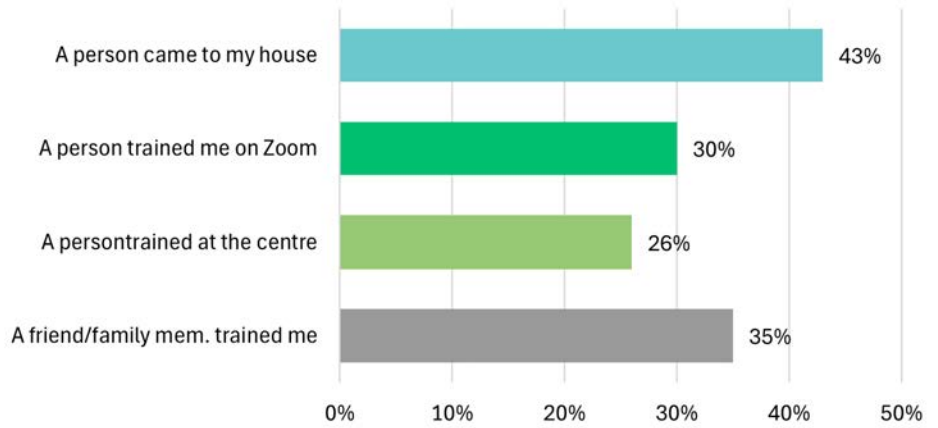


TABLET TRAINING AND TECHNICAL SUPPORT

A key factor in seniors' satisfaction with the tablet is the training and support provided to organization managers and staff, carers, and seniors by Human Endeavour when they receive the device. Eighty-three percent of managers (manager-Q14) and 64% of carers (carer-Q10) either strongly agreed or agreed that they had received sufficient training. Participants in the TEHL project had the option to attend training in person or via Zoom. Both the manager or worker and the carer received training, and in most cases, the senior was also present during the training session.

Q9: How did you receive your training? (Select all that apply.)

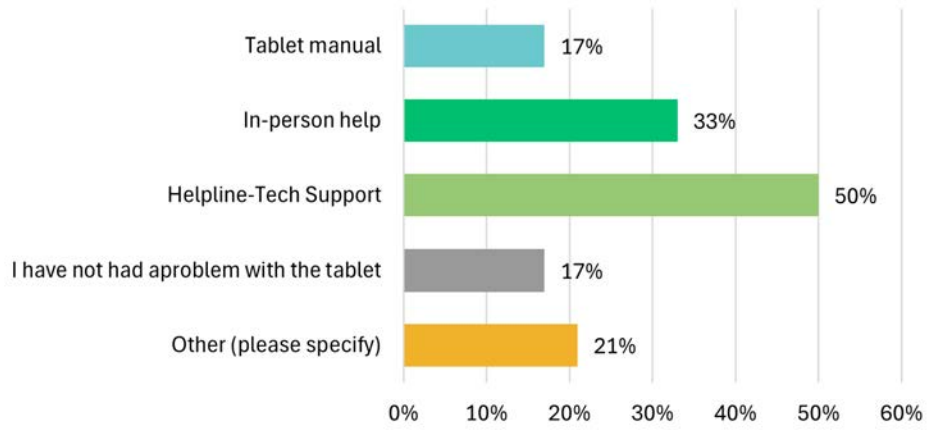
(Note: There were 23 respondents.)

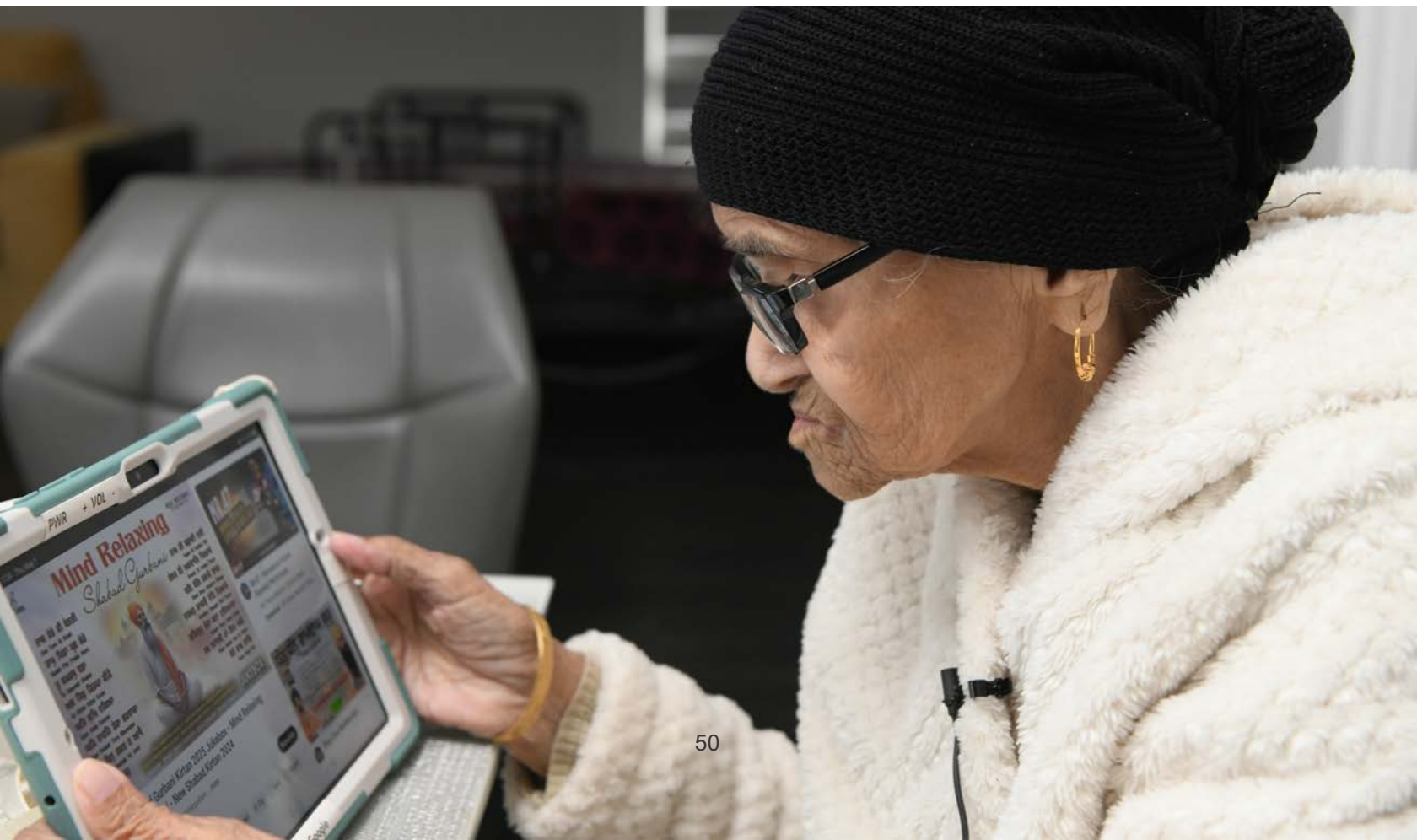


While one of the seniors we interviewed acknowledged that he didn't need much training because he had existing knowledge from his career working with computers, he recognized that training and support are important for people who are less familiar with technology.

One senior suggested that a prebooked follow-up visit or call would be helpful. In addition to the trainer's manual, helpline, and remote access to troubleshooting in real time, some seniors mentioned friends and family as sources of support.

Q9: When you have a problem with the tablet what kind of technical support do you find helpful? (Select all that apply.)
(Note: There were 24 respondents.)





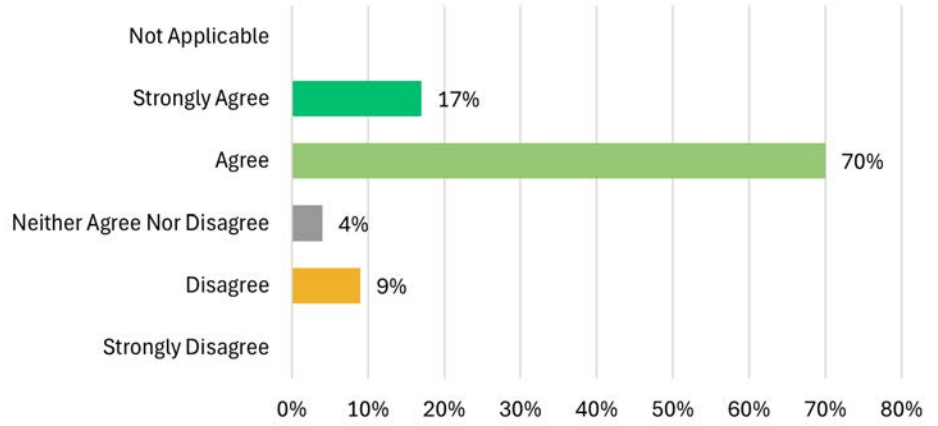
SENIORS' HEALTH AND WELL-BEING

IMPROVED HEALTH BEHAVIOURS AND MOOD

Providing care for a senior living with dementia is very challenging. Despite significant advancements in technology, the cognitive decline associated with dementia presents unique challenges in delivering technology to effectively support seniors with dementia. The Human Endeavour design team's understanding of dementia and the fact that they co-designed the TEHL tablet with people with dementia and community partners meant that the customized tablets provided to seniors were very effective in improving the overall health and well-being of the tablet recipients. Eighty-three percent of seniors either strongly agreed or agreed that the tablet improved their health behaviours (Q24).

Q24: The TEHL tablet has improved my health behaviours, e.g., taking medication, drinking water, eating regular meals, staying connected with people, keeping my brain active, etc.

(Note: There were 24 respondents. The 1 "not applicable" response was excluded.)

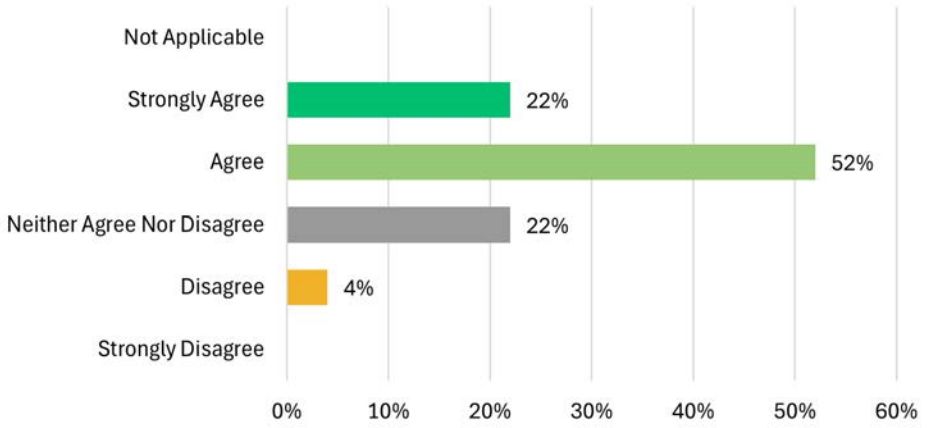


The tablet also lifted the seniors' mood.

While seventy-one percent of seniors either strongly agreed or agreed that the tablet lifted their mood (senior-Q18), just 42% of carers either strongly agreed or agreed that the tablet lifted their mood (carer-Q31). The discrepancy between the tablet's effect on the mood of seniors and its effect on the mood of carers could be accounted for in a number of possible ways.

Q18: : I find the TEHL tablet lifts my mood.

(Note: There were 24 respondents. The 1 “not applicable” response was excluded.)

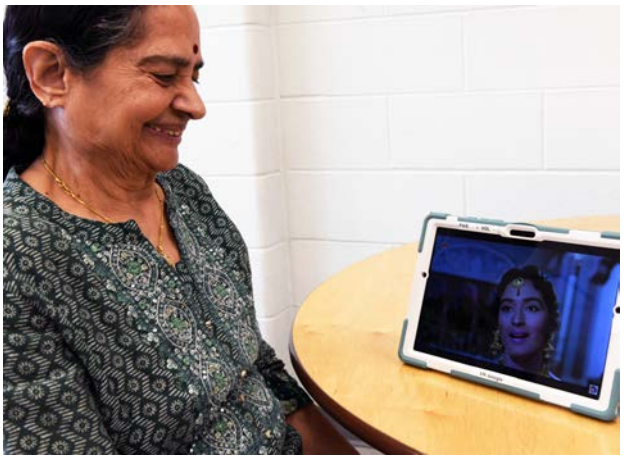


A senior who is having a direct experience with the tablet may feel joy, excitement, and/or distraction from their worries, while a carer, as an observer, may be more focused on their care responsibilities and not as able to appreciate how impactful the senior's experience with the tablet is. Seniors too may have a stronger emotional connection to the activities they engage in on the tablet, especially if those activities provide comfort or an opportunity to relax or reminisce. Caregivers may not fully appreciate how these activities positively affect the emotional state of the senior, especially if the senior is not very able to articulate their feelings. And the senior's expectations for the tablet and what it can bring to their life may be different from the carer's expectations. For the senior, small moments of joy may be impactful and lift their mood, while the carer may wish for the tablet to have a more profound effect that leads to longer lasting mood changes for the senior.

Not surprisingly, the responses of both carers and seniors to the question of the impact of the tablet on their mood reflect some ambivalence.

A senior said the following:

> ***Yeah, I like not seeing movies, I like songs of old movies.***



He was then asked by the interviewer if it made him happy to see old movies and hear old songs. He said this:

> ***Yeah. I don't know happy because I am losing my all my past. When I see the movies, I forget about everything.***

In the interview with this senior, the interviewer recognized and acknowledged the senior's sadness that he forgets things, and she told him she was happy that the movies he watched on the tablet seemed to help him forget his worries. She then began a delightful exchange with him about a prominent Indian actor and film producer who works in Hindi cinema, someone familiar to both of them. In fact she learned that the senior was a "**diehard fan.**"

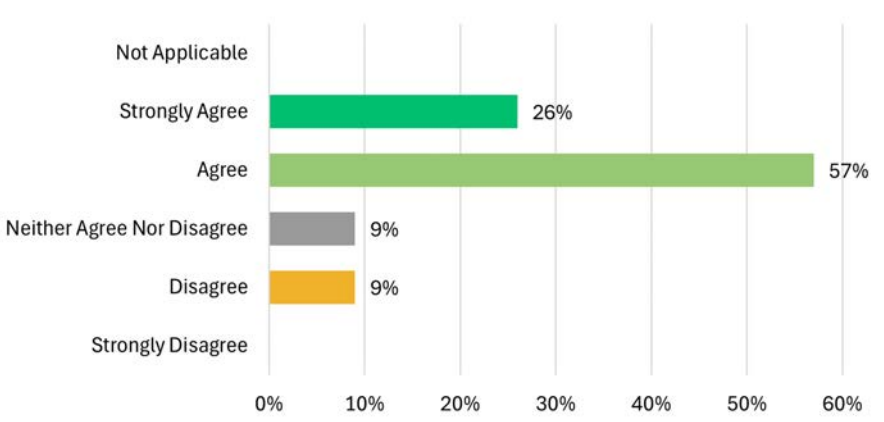
This moment during the interview speaks to the importance of building a relationship even within the limited time of a research interview. The conversation with the interviewer about a favourite movie star probably did a great deal to lift the senior's mood.

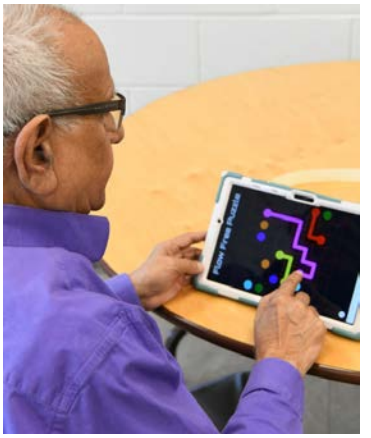
The tablet kept the seniors' brain active.

> ***The games have a great impact. I think it's very impactful..., I started the game, and I could do it. And it was fun. And so, I went back to do that again. Right. And that was so rewarding. I played that game and it's like a drug. When you get that level filled up, I mean, you're like, oh, I did something useful with my life. Yeah. It's very rewarding. I liked it. But, when it went up a level, it was no good. You know, it was frustrating me. I couldn't try and challenge myself because it was beyond my capabilities. Yeah. Which is maybe okay because somebody that had better capabilities would want that. Right.***

Q21: The TEHL tablet allows me to keep my brain active.

(Note: There were 24 respondents. The 1 "not applicable" response was excluded.)





PROTECTIVE FACTORS

As mentioned earlier in this report, it is widely acknowledged that nearly all seniors in Canada prefer to age in place. Innovative technology can play a key role in supporting seniors living with dementia who wish to maintain their independence and their strong connections with their community, family, and friends while ensuring their safety and security.

SENSE OF AUTONOMY, INDEPENDENCE, AND EMPOWERMENT

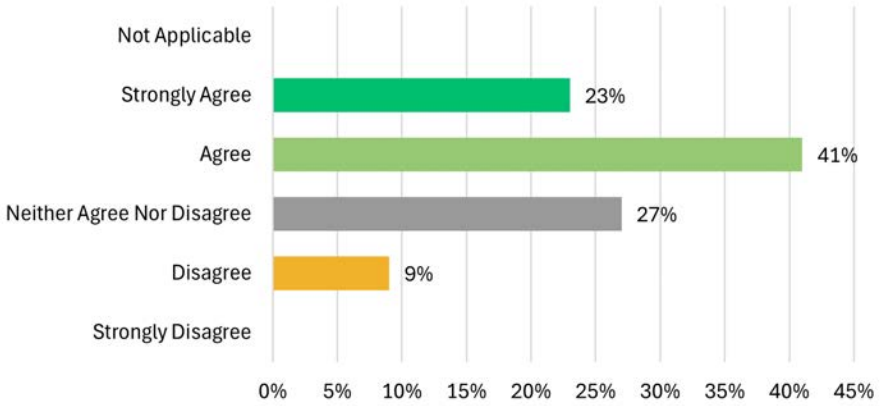
The tablet's reminders support independence, especially for those living alone, by helping them remember important tasks without relying on family members.

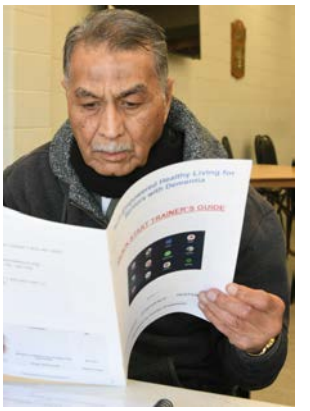
> ***So, after I get this tablet, I am very hopeful that I not alone if I have any problem first I get the solution in Google and watch the things on YouTube and I have contact with outside the world. A lot of benefits like remind me about my medicines, about my lunch, about dinner, breakfast, what time I have to sleep, what time I have to wake up. So, all these remind me it make me punctual.***

The tablet also enables the senior to independently access information about health, diet, and exercise, empowering them to take control of their well-being.

> ***Yeah, on the tablet I look at YouTube, mostly news. And about my health problem and diets, and about exercise. Exercise is necessary, especially in old age. Old age problems. A lot of things I watch, and I like good new information.***

Q21: The TEHL tablet allows me to be more independent because it reminds me of various daily tasks and connects me to appointments/activities.
(Note: There were 24 respondents. The 2 "not applicable" responses were excluded.)





SOCIAL INCLUSION: CONNECTIONS WITH FAMILY AND FRIENDS

Seniors talked about how the tablet can help keep people with dementia engaged and reduce loneliness. They emphasized the importance of companionship and of staying occupied to prevent suffering from isolation.

> ***So tablet make change in my life. Like the problem, problems reduce like health better, improve social life good, mentally feeling free of depression. So also contact with my relatives and good entertainment. And yeah I am not feeling right now in depression and alone lot of benefits of this.***

One senior also talked about the pleasure he gets from listening to the Quran online and to songs by Lata Mangeshkar. He joked,

> ***I like to see songs. Once I saw her face, I don't know. She's not nice looking, but I like her songs.***

His wife was impressed with how talkative he was. She reported that he doesn't talk with anybody in the house, not even the personal support worker (PSW) who comes. She went on to share how this impacts her.

> ***But when people call like you he behave like this. He knows everything and he behave good. See now he's speaking good loudly. So could you add some meeting every week or every day even talk with him for 10 minutes at least half an hour maximum. Then I'll be relieved. Because now he talks. I can do my exercise.***

The interviewer told her that some community organizations offer Zoom "coffee chats" for seniors with dementia. She said she would talk with a worker at his community centre to see what might be available for him.

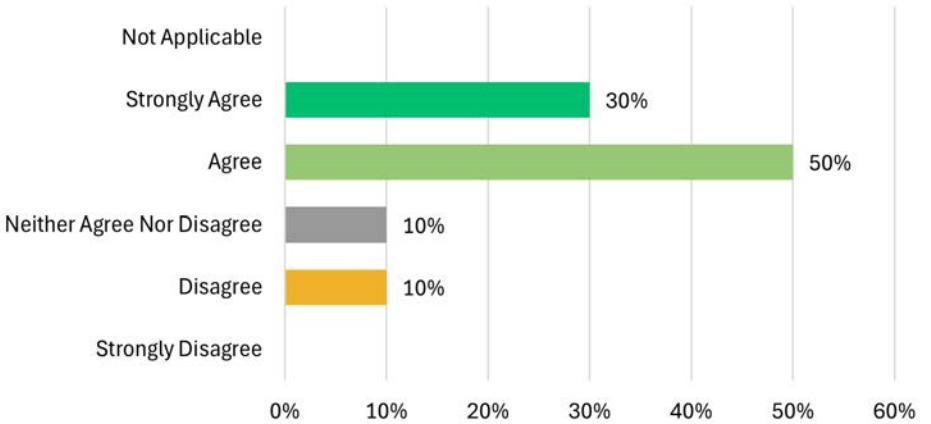
SENSE OF SAFETY AND SECURITY

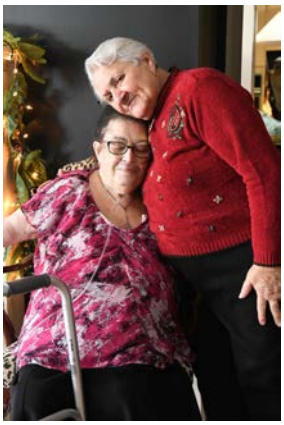
Here we will evaluate the tracker as well as the tablet. In several interviews, seniors confirmed that the tablet helped create a sense of safety by allowing them to stay connected with the world and especially their loved ones. One senior explicitly stated feeling safe and not alone because the tablet offers picture calling and it is easy for him to connect and summon help if needed. Other seniors also remarked on the sense of safety the tablet provided them and on how it links them to their social connections, which contributes to an overall feeling of security. One carer remarked how the tablet also provides them with a sense of safety and security and a feeling of "comfort" about leaving their spouse alone. Another carer referred to the tablet as a "friend" that keeps their father safe. The device also simplified the life of seniors. It reduced frustrations and increased their confidence, which gave them a greater sense of security in their daily life.

> ***It makes me feel better, too, that I know he has the tablet right there. So, if I'm gonna go to town or something, I know he's got easy access to me. It's comforting, more like it's like, okay, I don't have to panic too much because he can reach me easily and he's happy at home with the tablet.***
>
> ***And also, when I travel outside it is with me when I go outside with me. So all the time it is with me just like yeah my daughters when go to school they said you are safe we are not worry that we are leaving you alone. You are not alone; your friend is with you.***
>
> ***The tablet has made life simpler, so yeah. There's no daily frustrations of trying to figure anything out. It's made it so simple. You know, nothing is an issue. I'm a little more confident using it too.***

Q19: I feel secure because the TEHL tablet helps to keep me connected with my carer or family or friends.

(Note: There were 24 respondents. The 4 "not applicable" responses were excluded.)





ADDITIONAL OBSERVATIONS

ON THE VIEWS OF MANAGERS, CARERS, AND SENIORS WITH DEMENTIA

The TEHL tablet is designed to keep seniors who are living in the community with memory issues and dementia engaged and informed and to enhance their social, emotional, cognitive, and physical well-being. As such, it represents an innovative and cutting-edge approach to program delivery. It also provides support for carers as they navigate their complex and challenging role supporting a person living with memory issues or dementia at home, in their community. Community organizations wishing to participate in the TEHL tablet program or similar programs in the future need to ensure that their staff have the necessary technology skills and that they have the resources required to offer the program to their clients.

One manager described the tablet as “almost a caregiver.” She emphasized the potential of the technology to support the well-being of both seniors with dementia and their carers by reducing the workload and stress on carers while improving the quality of life for the seniors.

Another manager said this:

> ***The tablets are very innovative and practical... technology enables our organizations to deliver services to a greater number of people... There are less and less supports available as funding is cut across provinces. It is nice to have something to offer when our clients are not finding support in many places. Thank you.***

The TEHL tablet technology has also come to play an important role in lessening the care burden of carers and ensuring the health and well-being of seniors living with dementia.

Both carers and seniors expressed satisfaction with the tablets and with the technical support they received through the training, the helpline, and the trainer's manual. They also put a human face on the tablet, referring to it as a “friend” a “companion” or even as a member of the family with a name.

Both carers and the seniors themselves agreed that the senior's quality of life had improved with the tablet and that there was an improvement in the senior's health behaviours with the reminders to complete activities of daily living such as taking medication, drinking water, eating regular meals, staying connected with people, and keeping their brain active. The reminders also provided the senior with a sense of autonomy, independence, and empowerment as they were better able to navigate their way through the day and needed to make fewer demands on their carer for assistance.

Seniors noted as well that the tablet lifted their mood and reduced loneliness, but one senior acknowledged that while there are moments of joy in his life now, there are also, understandably, moments of sadness over what he has lost.

> *Yeah. I don't know happy because I am losing all my past. When I see the movies though, I forget about everything.*

And another senior said this:

> *So tablet make change in my life. Like problems reduced like health better, improve social life mentally feeling free of depression. So also contact with my relatives and good entertainment. And yeah, I am not feeling right now in depression and alone, lot of benefits of this tablet.*

Overall, the seniors enjoyed the entertainment features of the tablet and the information they obtained from Google. These features provided a welcome diversion, a source of information, and a way to stay connected with the world, for both the senior and their carer.

Seniors also saw the tablet as providing them with a sense of safety and security through picture calling; with a tap on the picture of their carer or family member they were instantly connected. Carers felt reassured that if they were away at work, meeting with friends, or attending to their own health-care needs they were able to stay in touch with their loved one. For those who used the tracker there was a sense of security and safety for both the carer and the senior when the senior left their home. The following comment is from a partner organization's staff member:

> *I was saying to someone a couple weeks ago that my vision for the future would be that whenever someone with early stages of dementia becomes a client, we say, here's your tablet. Everyone gets one.*
>
> *Because if we can get them to use the tablet early enough, then it may help slow the progression and then they can be more independent for longer. And a lot of our clients who are carers, they're so stressed out and so burnt out that they're not able to take advantage of all of the services that we offer so it would be helpful for them. So, we start them off on the tablet with one or two things, and if we're able to get those stress levels down a bit, then they might take advantage of some other things. But I think that if we had the ability and the funding to give out more tablets, then we could help keep those stress levels down to the point that we can support these clients, much more effectively long term.*

RECOMMENDATIONS

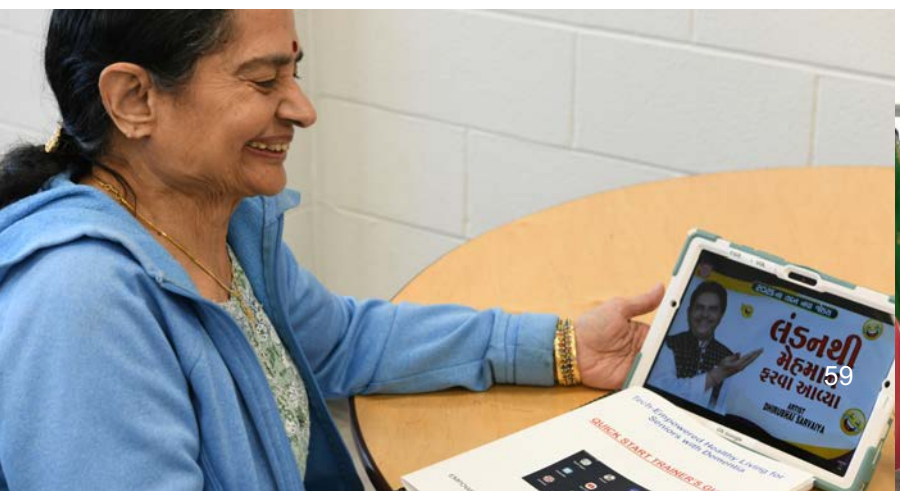
MANAGERS

The organization managers who participated in this study provided several recommendations based on their experience with the tablet. These recommendations are discussed below.

Although they received training, they felt that additional training would be beneficial. One manager suggested including more graphics and less text in the trainer's manual, to make it easier to follow. It was recommended that reminders be introduced gradually for clients who are less experienced with technology. Rather than providing all the reminders at once, it may be more effective to start with one reminder per day, allowing clients to become familiar with the system. This approach could help prevent seniors from feeling overwhelmed, as they tend to get stressed when faced with too many reminders at once.

In the interviews, the managers made some specific requests. For example, one manager asked if web links for the local multilingual newspapers could be added to the tablet so that seniors could read the news in their own language. Because the tablets are customizable, that request was passed along to the design team who could make the necessary changes. Other managers mentioned that their organization offers programs in person, online, and in a hybrid format, so seniors with the tablet can have easy access through Zoom to those programs. The tablet could be programmed so that the program would come on at the correct day and time, eliminating the need for the senior to remember the time and day of the program or to remember how to get on Zoom. This information was passed on by the interviewer to carers and seniors in subsequent interviews.

A manager commented that the tablet “covers the feature of wraparound services,” referring to its ability to provide a comprehensive approach that addresses the various needs of a senior living with dementia. Another manager described the tablet as “very innovative and practical” and stated something a senior had shared: “I got my friend who spends quality time with me.”



CARERS

Overall, the feedback from carers and seniors was very positive. There was excitement about trying a new technology, and they were grateful to have this opportunity. Using the tablet did not work out for some of the seniors, but it was because their dementia had progressed too far and they could not learn to navigate through the tablet's options.

In their interviews, carers provided several recommendations, mostly focused on service requests. One carer expressed a desire for her loved one to be more engaged with family and friends, suggesting that having WhatsApp and Skype on the tablet would be beneficial. Staff on the helpline, with remote access to the senior's tablet, were able to add those apps and fulfill the carer's request.

Another carer raised concerns about the telephone and WhatsApp features. Their concerns were promptly addressed. Managers, carers, and seniors all spoke positively about the ease with which they were able to receive support and troubleshooting for more complex issues, something which they consider essential.

One carer shared that, overall, she found the tablet's features very helpful. She described the tablet as being "**like a good hand, a hand to help me. Yeah, it's a helpful device.**"

Carers also appreciated the tablet for the peace of mind it provides them.

> ***I could leave him with the tablet, and he can just relax with it and I can go out and enjoy shopping or enjoy my meeting with other people. He can get a few hours of enjoyment through solitaire. It helps him so that I can go somewhere or do a load of laundry or whatever. And I know he's playing with the tablet, and he doesn't even realize I'm gone because he's enjoying it. It is great because if he gets worried when I'm out he could contact me on the tablet phone.***

Carers highly recommended the picture calling feature.

> ***So, it's easy for them to call me whenever they need something. Just one click and my phone rings. So that's another feature that is very helpful and supportive. It's helpful totally, emotionally, it's peace of mind.***

Carers recommended the tablet for its ability to engage the carer and the senior in pleasurable activities they can enjoy together. Making time for shared moments of laughter and enjoyment reduced conflicts and arguments and reminded both the carer and their loved one of the pleasure they have taken and can continue to take in their relationship.

Regarding training, one carer recommended in-person sessions if possible. She explained that her mother had had an in-person training session with a staff member from Human Endeavour and found it very beneficial. She felt her mother's introduction to the tablet would not have been as positive if the training had been conducted online.

Several carers suggested giving the tablets to seniors early in their dementia journey. They felt that introducing the tablet at a later stage, when the condition had progressed, led to a poorer adoption of the technology.

> ***I definitely think that it is best at the very early stage., Right now we're at a point where, new things are just really hard to introduce to her. I find that a new thing, she either just ignores it, or loses it, it's just not sticking. It's just been a lot harder to get the most benefit out of it right now. So I could see how if we had had it four years ago, we could have utilized it a lot more.***

SENIORS

Seniors enjoyed the opportunity to provide feedback on their use of the tablet and the impact it has had on their well-being. They were especially pleased to be seen as an important member of the research team, and they willingly shared their recommendations. One senior, who showed the interviewer a wide array of technology he uses including a robot called LOOI, recommended that the tablets be more interactive in the future.

> ***The tablet should talk like we both are talking. It should talk back like us. If any patient with or without dementia is alone, he will suffer. He needs a companion always. That's the only remedy to recover for sure.***

This senior made a strong case for technology in reducing loneliness for older adults living alone, particularly those with dementia. He highlighted how gadgets can provide companionship and help decrease feelings of loneliness.

Another senior emphasized the importance of the games on the tablet. She acknowledged that they could be frustrating sometimes when you cannot get it right away, “but once you do it, I mean, it's the best feeling in the world.” She highly recommended the games and described them as “impactful.” “They keep my brain active.” Several other seniors said similar things. They too recommended the games, especially the ones with which they were already familiar and could now play on the tablet.

Regarding training, another senior recommended that there be a second training session a month later.

One senior who had had a career in IT felt the training was less necessary for him. He also found the reminders intrusive and asked that they be reduced. Both this senior and his carer enjoyed them but found the commercials in some of the games annoying. Initially, he found the tablet fun and different and amusing but then over a period of time, his enjoyment waned because of the constant reminders throughout the day and the commercials, and he put aside the tablet. The senior then mentioned some other concerns.

The interviewer valued receiving such honest feedback, especially because the tablet is customizable and can be programmed to meet each senior's needs and preferences. A discussion followed about how the senior would like his tablet programmed. Interestingly, the senior noted that as his “brain fog” increases in the future, he might, for example, need more reminders. He was reassured that his feedback would be shared with the design team, and adjustments could be made to his tablet.

This interview highlighted the importance of recognizing the individuality of people living with dementia, of considering their lives before they started having memory issues or received their diagnosis of dementia, and understanding their familiarity with technology beyond just a couple of questions on the intake form. We recommend that, during intake, the senior and their carer be given an opportunity to introduce themselves in more detail.

We also support a recommendation made by one senior to offer a follow-up session a month after a senior receives their tablet (or sooner, if possible) to assess how well the tablet matches the senior's needs and preferences. This would enable adjustments to be made before frustration sets in and the tablet is abandoned.

CONCLUSION

The success of any innovation depends on a supportive environment shaped by factors such as market demand, nontraditional yet practical solutions, a collective desire for change, creative thinking, strategic partnerships, a strong support structure, and cost-effectiveness. The Tech-empowered Healthy Living for Seniors with Dementia (TEHL) project is a compelling example of how these factors can align to drive meaningful innovation. By addressing a real and growing need, leveraging user-centered design, fostering collaboration across sectors, and ensuring accessibility and affordability, TEHL has successfully translated innovation into impact, improving the lives of seniors with dementia across diverse communities.

Seniors with dementia and memory challenges face significant barriers when it comes to accessing effective care at home. While many dementia-related interventions exist within clinical or institutional settings, these solutions are often inaccessible to older adults aging in place. One of the major obstacles is the lack of personalized, intuitive assistive technologies—most off-the-shelf products are not designed with the unique cognitive and physical needs of seniors in mind. Recognizing this gap, Human Endeavour has developed a first-of-its-kind assistive technology tailored specifically for seniors with dementia. This innovative solution combines user-centered design with simplicity and adaptability, empowering seniors to maintain independence and dignity while reducing caregiver burden. By bridging the accessibility divide, Human Endeavour is pioneering a new model of dementia care for the home environment.

Building on more than two decades of experience, Human Endeavour has supported over 800 seniors from diverse backgrounds, continuously evolving its approach to meet the complex needs of aging populations. Through this work, the organization has designed, tested, and refined a range of assistive technologies tailored to seniors' changing needs. During the COVID-19 pandemic, Human Endeavour launched its first-generation tablet, a solution that enabled seniors to stay connected from the safety of their homes. This was followed by a second-generation tablet designed specifically for blind and deaf users, further expanding accessibility. The latest generation of tablets incorporates advanced features such as intelligence, automation, voice command capabilities, enhanced security, and multilingual reminders. These innovations work together to improve seniors' safety, social connectivity, and ability to manage daily tasks independently, setting a new standard in personalized, tech-enabled elder care.

TEHL is a collaborative initiative aimed at enhancing the well-being of seniors with dementia through the thoughtful integration of assistive technologies. Developed with input from healthcare providers, community partners, caregivers, and seniors themselves, TEHL promotes independent and safe living in community settings. Partner organizations have expressed strong support for the program, recognizing its immediate impact on quality of life and its role in transforming service delivery models. The program also lays a foundation for the long-term integration of technology into elder care services.

To ensure accessibility, the tablets are supported by a multilingual training manual, ongoing tech support, and remote troubleshooting tools. This is further strengthened by a dedicated call-center helpline and secure remote login assistance, creating a robust, nationwide support system that empowers seniors and their caregivers to use the technology with confidence. Equipped with embedded SIM card connectivity, allowing it to function reliably anywhere in Canada, including rural and remote regions.

A community-academic partnership conducted a comprehensive impact evaluation to assess the efficacy of the technology and its influence on the well-being of seniors and their caregivers. This evaluation not only measured outcomes but also informed the ongoing refinement of the solution. Collaborating with 13 senior-serving organizations across Ontario and Alberta, the project gathered real-time, on-the-ground feedback that directly shaped product enhancements. This dynamic, feedback-driven process has been instrumental in iteratively improving the technology and ensuring it remains responsive to the evolving needs of seniors aging in place.

As a registered charitable organization, Human Endeavour leverages both its technology expertise and non-profit status to keep costs low, attract mission-aligned funding, and prioritize social impact over profit. This unique positioning allows Human Endeavour to focus on reaching underserved populations with accessible, high-quality solutions. Guided by a clear and forward-looking technology roadmap, Human Endeavour are committed to continuing the development of simple, intelligent, and user-friendly tools that empower seniors, particularly those living with dementia, to live safer, more connected, and more independent lives.

NEXT STEPS

Human Endeavour's vision is to develop and deploy innovative, accessible, automated, and individually customized human interface technology that is user-friendly for seniors and carers from diverse ethnic backgrounds and with a wide range of disabilities to enhance their quality of life and extend the length of time they can age at home. Human Endeavour's long-term collaborators in the senior-serving sector will be able to prioritize the services that will best meet their clients' needs by harnessing the real-time data on their clients' activities of daily living that the technology can provide.

As one senior living with dementia who is using our tablet stated, ***"Now I have a good friend, it's name TEHL Tablet."***

The hope is that as Human Endeavour's technologies are deployed, there will be fewer emergency situations at home and clients' quality of life will improve, which will in turn decrease hospital visits and ultimately result in significant capacity improvements and cost savings in the health-care system.

In 2025, Human Endeavour plans to turn seniors' residences into "smart" homes equipped with sensors that will monitor the activities of daily living for seniors who live alone, are frail, have early dementia, or are experiencing memory challenges. They are currently testing various sensors, including fridge door openers and sensors for sleep and rest patterns, washroom use, and physical activity. When triggered, the sensors will relay information to a secure database. Human Endeavour will establish a baseline for a senior's regular patterns and behaviours and then track deviations, which could provide an early indication that the senior's condition has worsened or something else is wrong. For example, if a senior has started waking up five times during the night to use the washroom, it could indicate that they have developed a new health condition.

In the near term, Human Endeavour plans to do some testing in a few homes. Eventually, they hope to implement this technology in individual homes, supportive seniors' residences, long-term care facilities, and other similar settings. Human Endeavour's extensive background in technology and their ongoing commitment to collaboration enable them to observe inefficiencies that other healthcare organizations might miss, which they aim to address with this new project. Their sensors should help improve the overall level of care that seniors receive, as well as enabling resources to be used where they are needed most.

In the future, Human Endeavour hopes to continue to expand the range of solutions they offer, such as technology to monitor vital health signs, manage chronic disease management, and support the development of smart cities/subdivisions. For all of these innovations, the right level of financial investments will be needed for the right amount of time to complete the necessary evidence-based research and development and to successfully launch, evaluate, and expand them.

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APPENDICES

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CONTACT INFORMATION

For additional information about the TEHL tablet or other technology innovations, please contact:

info@humanendeavour.org

www.humanendeavour.org

439 Glenkindie Ave. Vaughan, ON, Canada, L6A 2A2

905-553-9291