Technology for enhancing the wellbeing and quality of life for people living with dementia
F. Abujarad (Convener)

Participants: F. Abujarad (the United States of America), A. Agboji (Canada), S. Freeman (Canada), H. H. Nap (Netherlands), A. Moreno (Canada). **ISSUE** Dementia is currently the seventh leading cause of death worldwide, and a major contributor to increased vulnerability for adults who require the help of a caregiver for maintaining a daily quality of life prior to condition onset (WHO 2023). In Canada, it is projected that nearly 1 million people will be living with dementia by 2030, and in the United States, trends predict that over 9 million Americans will have dementia by 2030 (Alzheimer Society of Canada 2022, Population Reference Bureau 2021). Additionally, the population in the Netherlands is expected to double by 2050 (Alzheimer Europe 2019). Technology can play a significant role in easing the burden of a myriad of issues related to dementia, such as improving mental health and improving the relationship between the caregiver and person with dementia. **CONTENT** Our symposium is designed to bring together speakers from Canada, the Netherlands, and the United States of America to highlight the theme of utilizing technology to improve and enhance the wellbeing of people living with dementia. The speakers will discuss topics of 1) a digital elder abuse intervention for use with older adults living with dementia, 2) mitigating apathy using eReader technology for persons with dementia, 3) the use of various AgeTech solutions to enhance both the care and quality of life of persons living with dementia, and 4) a theoretical model for the development and introduction of gerontechnologies for use with older adult-caregiver dyads. **STRUCTURE** Abujarad will introduce the digital elder abuse project called VOICES, a web-based screening intervention designed for a tablet interface that combines education, screening, and brief psychoeducational interviewing to enhance detection of abuse among older adults living with dementia in the emergency department setting. Agboji will discuss using eReaders to improve apathy symptoms among people with dementia, and the implications for integrating this technology into daily routines. Freeman will present on how AgeTech such as a hydroponic gardening wall, circadian lighting, and a virtual exercise program can benefit persons living with dementia to support their health and wellbeing, as well as the barriers associated with this technology. Moreno will introduce a theoretical model representing the journey of individuals living with dementia, as well as their caregivers, and their relationship with gerontechnologies and how the use of gerontechnology can be beneficial and adapted throughout the progression of an older adults' dementia. Finally, Nap will discuss a case study on improving acceptance and compatibility with socially assistive robots using co-design methods based on user needs. **CONCLUSION** Adaptation of technology into the lives and environments of people living with dementia can provide benefits to their quality of life, as well as for their caregivers. Integration of this technology can face certain barriers, but this symposium will encourage people to consider the important role of assistive technology with this critical population.

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Enhancing elder abuse detection for older people living with dementia with a digital intervention

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Purpose Alzheimer's and other related dementias affect roughly 6 million Americans annually, manifesting with progressive cognitive impairments and inability to perform activities of daily living (Manly et al., 2022). People living with dementia (PLWD) have increased care needs compared to those who do not have dementia (Lacher et al., 2016). This increased vulnerability puts them at a higher risk for elder abuse (EA) (Rogers et al., 2022). Emergency department (ED) settings provide an excellent opportunity to detect EA because of the high utilization of ED among PLWD. However, various challenges persist with traditional screening methods. We designed a tablet-based digital intervention called VOICES to increase detection of EA. Our intervention combines screening, educational resources, multimedia elements, and brief motivational interviewing to encourage older adults to self-report EA. Our previous study in the ED demonstrated VOICES' feasibility among cognitively intact older adults (N=1,002), but there is limited evidence to support the feasibility of self-administered interventions to detect EA among PLWD. **Method** Our primary objective in this study was to evaluate the feasibility of the VOICES digital intervention with PLWD. Subjects were at least 60 years old and recruited from the Yale New Haven Health System (YNHH) in New Haven, Connecticut, USA. We used the Montreal Cognitive Assessment (MoCA) to determine baseline cognitive capacity, excluding those with severe cognitive impairment (MoCA <14). Research assistants (RAs) completed initial consent and demographics collection, who then administered the assessment to eligible ED patients. After completion, participants were invited to complete a post-use questionnaire. These questions, presented on a Likert scale, ascertained participants' feelings and perceptions regarding acceptability, feasibility, and adoptability. **Results and Discussion** From February 2022 through July 2022 we identified 137 subjects, after application of inclusion and exclusion criteria 101 subjects were enrolled. Among participants, 58% were female, and mean age was 77 (+/- 7.87 SD). Our findings strongly suggest that patients whose MoCA scores ranged from 14-25 can use VOICES similarly to those without cognitive impairments (MoCA<25). Out of the 101 participants who participated in VOICES, 99 participants finished the questions independently and to completion (98% rate of completion). Out of the participants who completed the post-use questions (N=99), 91% agreed VOICES was appropriate for learning about EA, and 84% were satisfied with their ability to complete VOICES on their own without assistance. When asked if using VOICES was easy, 96% of participants agreed, and 80% felt safer after using VOICES on the iPad. These findings suggest that VOICES is feasible for detecting EA in PLWD, which could have implications for detecting and ultimately further preventing severe EA cases and unnecessary recurring visits in the ED.

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Keywords: elder abuse, screening, dementia technology, mistreatment, digital health
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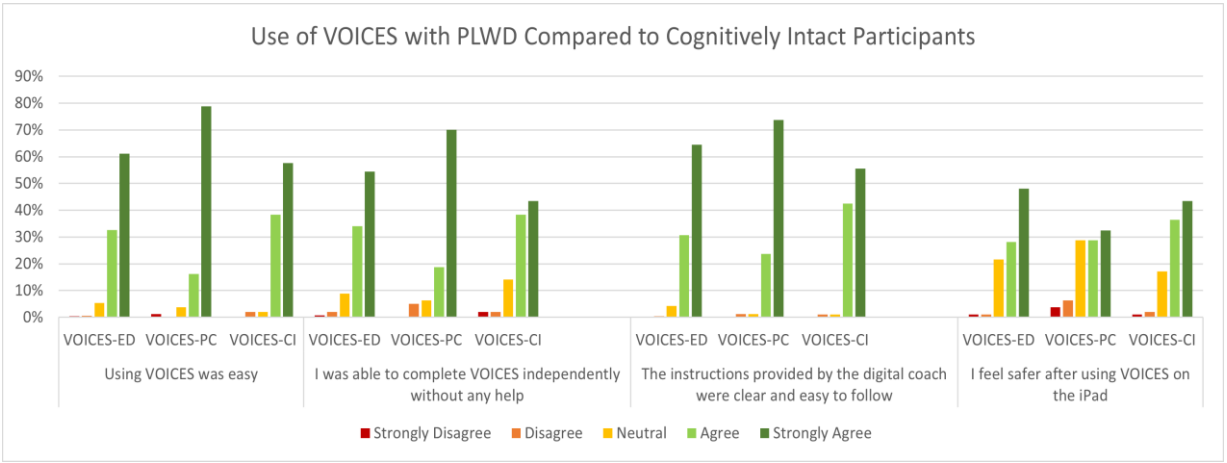

Figure 1. Use of VOICES with PLWD compared to cognitively intact participants

Combatting apathy in long term care facilities with eReaders: A pilot study

A. Agboji & S. Freeman

Purpose Research has shown that more than 80% of people living in long term care facilities have apathy (loss of interest or motivation) that can adversely impact their quality of life, cognition, and wellbeing (Zuideima et al. 2009; Nijsten et al., 2017). Despite the availability of simple interventions to improve apathy, health care workers fail to address this issue (Jao et., 2019). The aim of this project was to pilot test the benefits of using Kobo eReaders (a cost-effective handheld device that is meant for reading and storing digital books) to mitigate apathy and improve the wellbeing of residents in long term care facilities across Northern British Columbia, Canada. **Method** This is a mixed method study. Residents with interest in reading were approached. Cognitively impaired residents who were unable to consent were excluded. All consented participants completed a self-report assessment questionnaire about apathy. Participants were given a Kobo eReader preloaded with books of interest and instructed on the use of the Kobo eReader. All those who enrolled participated in the program for a period of 8 to 12 weeks. After the intervention was completed, a post-intervention assessment was conducted. A logbook was kept to track the participants' engagement during group reading sessions. We also collected data about the other benefits derived from participating in the program through semi-structured interviews. The interviews were transcribed and analyzed using NVivo software **Results and Discussion** Out of the 20 participants, 14 were females. Age ranged between 51 and 98 years old. All participants were educated. Eight people reported apathy symptoms at the start of the program, however, at the end of the program, six people had recovered from apathy. The majority of participants were highly engaged in reading activities throughout the program implementation, and all participants expressed that being part of the program had motivated them to engage more in group activities and read more than they would have without the device. The results showed that reading using a simple and cost-effective technology such as the Kobo eReader may improve apathy and contribute to feelings of wellbeing among residents in long term care facilities. In addition, older adults in long term care facilities were open to try out new technologies and were willing to use technologies that support them to continue what they have always enjoy. This research highlights the feasibility and benefits for novel types of activities and actions using technologies, that are easily available, to be integrated into the daily routines to enhance the quality of life and wellbeing of persons residing in long term care facilities.

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Keywords: apathy, long-term care facilities, reading, older adults, technology

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Supporting provision of quality of care through sustainable implementation of AgeTech for persons living with dementia in rural areas

S. Freeman, S. Sousa, D. Banner-Lukaris, K. Skinner, E. Rossnagel, R. McAloney

Purpose AgeTech can play an important role to support equitable access to high care for persons aging with dementia, especially in rural areas where access to formal care and supports may be limited. To enhance the quality of life and support provided to persons with dementia who wish to age in a rural community, a new facility was designed with AgeTech solutions embedded in their philosophy of care. A mixed methods study, guided by the Theoretical Domains Framework, was conducted to explore the contextual barriers and facilitators to AgeTech implementation in the rural context. **Method** The Center for Technology Adoption for Aging in the North (CTAAN), worked in partnership with health systems leaders, and community partners, to select multiple AgeTech solutions to enhance both the care and quality of life of persons living with dementia. AgeTech included in this study were a hydroponic gardening wall, circadian lighting, and a virtual exercise program. Semi-structured interviews were held with facility staff, health systems leaders, representatives from the AgeTech companies, and implementation leads including a secondary analysis of existing documentation was conducted. **Results and Discussion** A range of barriers to AgeTech implementation were identified including geographic context, complexity of dementia symptoms, and limited experiences by older adults with technology. The barriers were countered by community driven mitigation strategies which included establishing collaborative partnerships with AgeTech companies, client interest and motivation, and creation of AgeTech educational resources. Results provide insights to inform planning and policy decisions for rural AgeTech implementation initiatives, highlight considerations for ongoing AgeTech innovation and describe the engagement of community partners in the process of integrating aging technologies. Persons living with dementia can greatly benefit from the use of AgeTech to support their health and wellbeing. Successful and sustainable implementation of AgeTech is possible when the AgeTech enables, empowers, and engages persons to age well.

Keywords: circadian lighting, exergames, hydroponic gardening, rural, dementia, quality of life, remote, northern
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A theoretical model for the development and introduction of gerontechnologies for use by dyads of older adults living with dementia and their family caregivers

A. Moreno

Purpose To present a theoretical model inspired in clinical research and practice to develop, refine, introduce, and personalize gerontechnologies for use by community-dwelling older adults living with dementia and their family caregivers at different stages of the disease process. **Method** Based on the results of a 10-year systematic review of the literature of gerontechnology use by people living with dementia and their family caregivers from 2012 to 2022 (Moreno et al., 2024a), a theoretical model is proposed using the Montreal Cognitive Assessment (MoCA) and the Mini-Mental State Examination (MMSE) to track cognitive impairment (Fasnacht et al., 2022). **Results and Discussion** The model represents the journey of individuals living with dementia, their family caregivers, and the relationship with gerontechnologies using two triangles. The longest side of the triangle of the person living with dementia represents the involvement needed with gerontechnologies in the dementia continuum (i.e., taking an active role using the technology). For family caregivers, the longest side of the triangle corresponds simultaneously to the increasing involvement with technology and the commitment with the care relationship (e.g., amount of time invested in care). As older adults move through the continuum from mild to severe dementia, they need more support from their family caregivers. Gerontechnologies must be adapted according to the clinical evolution of the person with dementia. Older adults with unimpaired cognition are actively involved in the decision process to choose the technology and they can manage it directly by themselves or together with the minimal involvement of the family caregiver (Moreno et al., 2024b). However, gerontechnologies that were helpful in the early stages of the disease will need to be abandoned and replaced with other technologies. Personalization is necessary to respond to the dynamic nature of the disease process and to the specificities of each caregiver – care recipient relationship. Considering the model presented, gerontechnologies should not be considered as a “one-size-fits-all” approach. Instead, they need to target a specific stage of the dementia process and be flexible enough to allow personalization to the needs and preferences of the end users.

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Keywords: gerontechnology, AgeTech, dementia, major neurocognitive disorder, community-dwelling older adults, family caregivers, aging in place, home support, older adult, aging.

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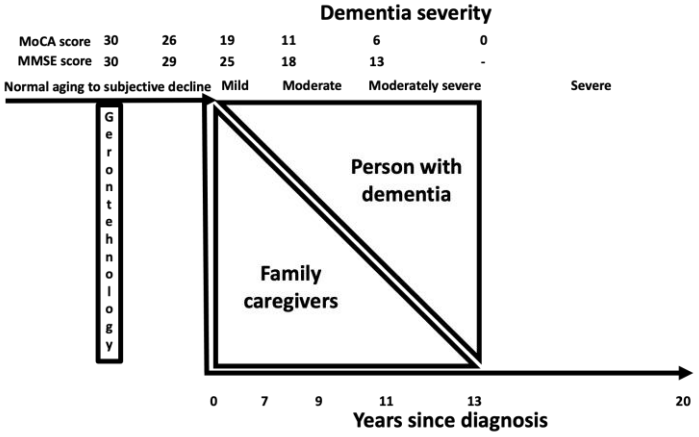

Figure 1. A theoretical model for the development and introduction of gerontechnologies in people living with dementia

Human-Robot Interaction: Enhancing co-design with responsible innovation

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Purpose Intelligent assistive technologies such as socially assistive robots (SARs) have the potential to support older adults, thereby possibly mitigating the global burden of cognitive decline related to ageing (Lenca et al., 2017). SARs can support older adults in daytime structure by providing reminders for medicine or food intake and offering social companionship (Bouwhuis, 2016; Vercelli et al., 2018). In order to improve the acceptance of SARs and enhance human-robot interaction (HRI), one possibility is to apply co-design methods (Sanders and Stappers 2008), ensuring that a design is based on the user's needs. Additionally, an approach, aimed at enhancing the social desirability and (ethical) acceptability of innovation, is responsible innovation (RI) (Owen et al., 2013; Owen & Pansera, 2019; Von Schomberg, 2013). In this research, we present a case study in which both a co-design and RI approach have been applied and compared to examine to what extent RI principles such as the active anticipation of positive and negative effects of innovation can complement the co-design of SARs for older adults. The overall goal of this endeavor was to ensure better compatibility in HRI between needs and values of end-users and the functionalities of a SAR. **Method** The presented case study is part of the Guardian project (AAL Europe, 2020) in which a SAR was developed for (frail) older adults. Two previously conducted studies involved a co-design process, one intended to draft the system's requirements and one to design a customization function for the SAR in which end-users could customize the gender of the voice, the speaking rate and the volume of the SAR. Alongside these studies, over the course of the three-year project, it was explored, together with project partners, what actions could be taken to foster RI. This exploration comprised, among others, several RI-workshops among project partners. **Results and Discussion** Results of the co-design and RI exploration were compared to learn to what extent they intersect or complement each other. The co-design activities have resulted in a clear set of requirements for the design of SARs. Moreover, complementing co-design with RI exploration supported the acceptance of SARs. While some ethical considerations, (e.g., privacy concerns and social isolation) were mentioned during the co-design activities, the RI exploration complemented the co-design process in terms of creating an action perspective on specific ethical considerations and pushing the project team on addressing these issues in the research and development. Accordingly, this case study suggests that co-design activities in the domain of HRI can be complemented by RI principles such as the explicit anticipation of implications, broader inclusion of stakeholders in doing so and fostering responsiveness of innovators to these resulting insights. Ultimately, this can foster the social desirability and ethical acceptance of SARs and other intelligent assistive technologies.

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