Developing assistive health robots for older adults: An international four-year project and participatory design case study

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CARES

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- CARES group, University of Auckland
- Ewha Womans University
- Sungkyunkwan University
- Pohang University of Science and Technology
- Robocare
- WEDO

Background

- Declining health due to ageing poses challenges for independence.
- Brain training & social engagement may help to support cognitive functioning while reminders support independence.[1,2]
- Assistive tech (games & robots e.g. Care-o-Bot[3]) help.

- While promising, older adults are often excluded in design due to underrepresentation & proxies (e.g., caregivers).[4]
- This creates issues with acceptability.

[1]Klimova et al. Cognitive decline in normal aging and its prevention: a review on non-pharmacological lifestyle strategies. *Clin Int Aging* 2017;12:903-10

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[4]Merkel & Kucharski. Participatory Design in Gerontechnology: A Systematic Literature Review. *The Gerontologist* 2019;59(1):e16–e25

Participatory design

- Includes future users as experts in design process.[1,2]
- Helps to avoid deficit framing (e.g., ableism/ageism) & promotes empowerment.[2,3]
- Contextually-dependent: acknowledges that people best experience products when using them in their personal spaces.[4]
- Crucial for ensuring that older adults can & want to use technology.[5]

[1]Sanders & Stappers P. Co-creation and the new landscapes of design. *Co- design* 2008;4(1):5-18
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Aim

To design, develop and evaluate a dailycare robot and cognitive stimulation robotic games, for use within older adults' homes.

End users:

- older adults with mild cognitive impairment (MCI)
- mild dementia (MD)
- various health-related needs (e.g., impaired mobility, vision and hearing)

Methods + findings

1. Defining requirements

- n=33 (9 people with MCI, 8 carers, 16 experts); interviews & cartoon strips

2. Scenario design

- n=18 (9 older adults, 9 experts); video scenarios

3. Technical development and suitability

- n=10 experts; actual interaction; interviews

4. Acceptability and feasibility of games

- n=12 (10 older adults, 2 experts); 5 weeks use; questionnaires & observations

5. Feasibility of dailycare robot with games

- n=6 older adults with health needs; 1week use; interviews

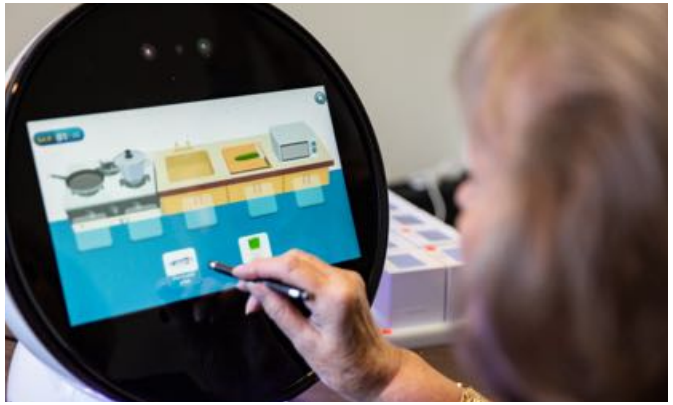
6. Effectiveness and usability of games

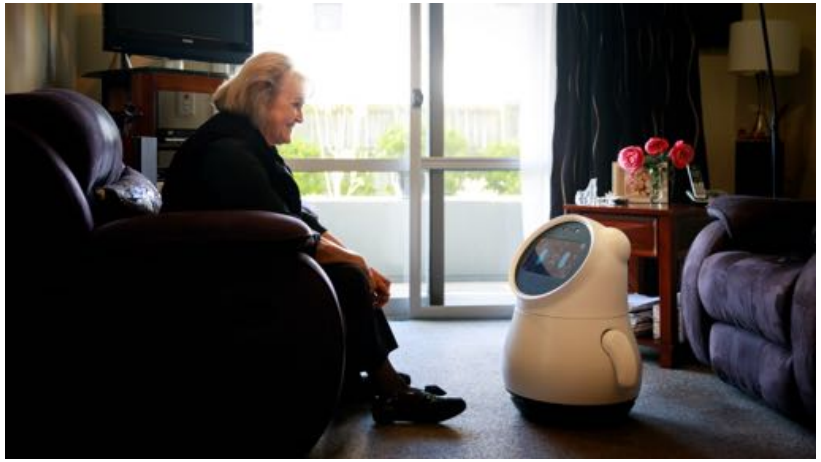
- n=40 older adults; 12weeks use; RCT

Discussion

- **Future users determined the requirements.** This contests traditional design, where developers imagine health needs or search for a problem to solve.[1,2]
- **Context was important**: work was conducted in homes/preferred spaces.
- The approach **avoided deficit-framing**[3,4] as the dailycare robot was designed to support independence.

- Centralizing the opinions of 119 stakeholders helped to design a user-friendly robot for supporting wellbeing through reminders & cognitive stimulation!





[1]Vandemeulebroucke et al. How do older adults experience and perceive socially assistive robots in aged care: a systematic review of qualitative evidence. *Aging & Mental Health* 2018;22(2).
[2]Law et al. Developing assistive robots for people with mild cognitive impairment and mild dementia: a qualitative study with older adults and experts in aged care. *BMJ Open* 2019;9(9)
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Questions?