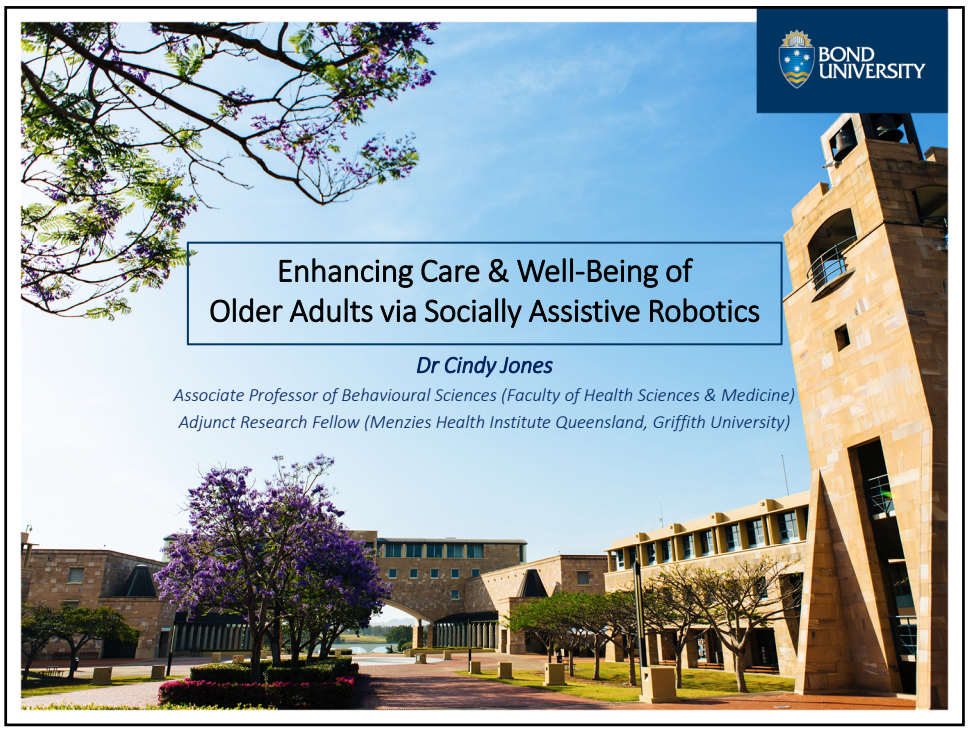
BOND UNIVERSITY
Enhancing Care & Well-Being of Older Adults via Socially Assistive Robotics
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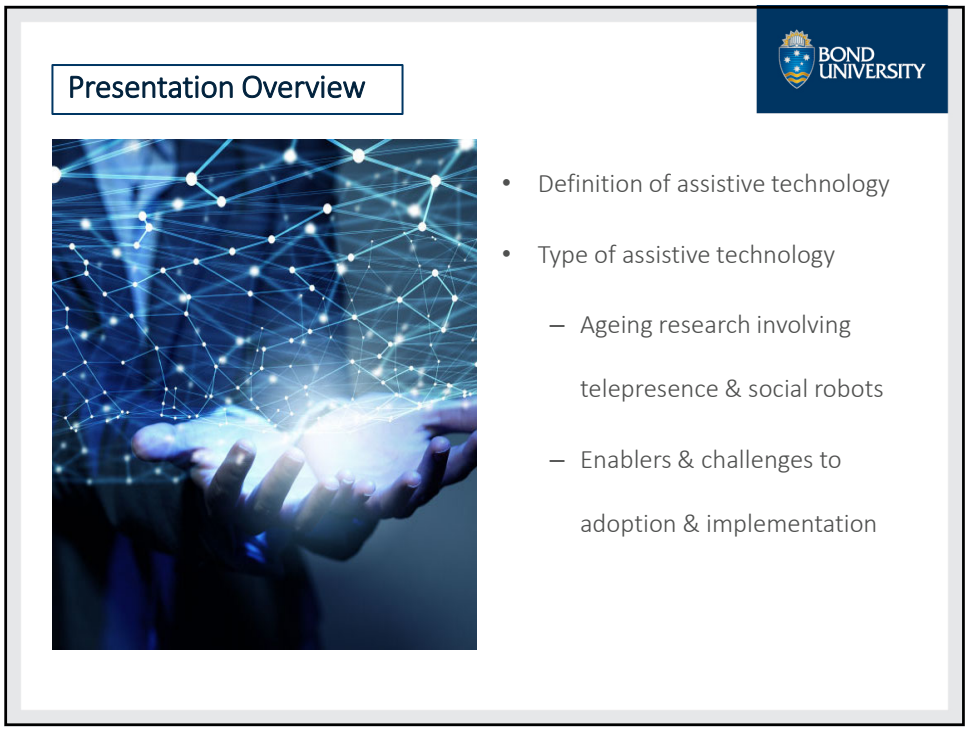
1


BOND UNIVERSITY
Presentation Overview
Definition of assistive technology
Type of assistive technology
Ageing research involving telepresence & social robots
Enablers & challenges to adoption & implementation

2

What is Assistive Technology?

3

WHO Global Cooperation on Assistive Technology (GATE):

Assistive Technology:
"an umbrella term covering the systems and services related to the delivery of assistive products and services."

Assistive Product:
"any product (including devices, equipment, instruments, and software), either specially designed and produced or generally available, whose primary purpose is to maintain or improve an individual's functioning and independence and thereby promote their wellbeing"

https://www.who.int/en/news-room/fact-sheets/detail/assistive-technology

4

Robotic Assistive Technology

3 Main Types:

1. **Rehabilitation Robotics**: pursue the recovery or regaining of impaired motor function
2. **Assistive Robotics (AR)**: substitute or compensate for missing motor and sensing skills
3. **Socially Interactive Robotics (SIR)**: primarily involved with human behaviour through robotic companion, speech and gestures.

Socially Assistive Robotics (SAR):
Cross between AR & SIR

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Socially Assistive Robotics (SAR)

- Acts as a social mediator
  - Human-computer interaction (HCI)
  - Human-robot interaction (HRI)
- Defined as an artificial agent embodied with features of a human or an animal
- **Telepresence robots**
  - Focus on human-computer interaction (HCI)
    - establishes connection between the telepresence robot (i.e. where the older person / patient is located) and the remote user (i.e. family carer / health professional) via the internet using specialised software downloaded onto a computer (i.e. at home / workplace)
- **Social robots, companion robots, social companion robots**
  - Focus on human-robot interaction (HRI)
    - assists people through social interaction rather than physical interaction

6

Telepresence Robots

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7

Social Robot - PARO

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NAO

Pepper


Palro


PaPeRo


Justo Cat

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Editorial & Review Articles

Editorial

Applying user-centred research design and evidence to develop and guide the use of technologies, including robots, in aged care

Wendy Moyle, Cindy Jones, Lihui Pu & Shu-Chuan Chen

Pages 1-3 | Accepted author version posted online: 06 Feb 2018, Published online: 03 May 2018

Download citation https://doi.org/10.1080/10376178.2017.1438057

Social Robots for Depression in Older Adults: A Systematic Review

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Key words
Depression, older adults, social robot

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Abstract

Purpose: In recent years, there has been an increase in the number of studies using social robots to improve psychological well-being. This systematic review investigates the effect of social robot interventions for depression in older adults.
Methods: The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) method was used to identify and select existing studies. Nine electronic databases were searched for relevant studies. Methodological quality was assessed using the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument. Screening, data extraction, and synthesis were performed by three reviewers. Inclusion criteria covered original quantitative studies investigating social robots for depression in older adults.
Findings: Seven studies were identified—six randomized controlled trials and one comparison study—with all classified as good quality. Social robot interventions consisted of companion, communication, and health-monitoring robots. Three studies presented promising outcomes for reducing depressive symptoms in older adults following social robot interventions, and three studies showed decreased, but nonsignificant, trends in depression scores.
Conclusions: The results highlight the potential of social robot interventions for reducing depression in older adults. However, the evidence is not strong enough to formulate recommendations on clinical effectiveness.
Clinical Relevance: Social robots are being used with increasing frequency to potentially provide personal support to older adults living in long-term care facilities. Social robots can be used to help alleviate depressive symptoms when used in group activities.

The Effectiveness of Social Robots for Older Adults: A Systematic Review and Meta-Analysis of Randomized Controlled Studies

Lihui Pu, MSN, Wendy Moyle, PhD, Cindy Jones, PhD, Michael Todorovic, PhD

The Gerontologist, Volume 59, Issue 1, February 2019, Pages e37–e51, https://doi.org/10.1093/geront/gny046

Published: 12 June 2018 **Article history**

Cite Permissions Share

Abstract

Background and Objectives

Social robots may promote the health of older adults by increasing their perceived emotional support and social interaction. This review aims to summarize the effectiveness of social robots on outcomes (psychological, physiological, quality of life, or medications) of older adults from randomized controlled trials (RCTs).

Research Design and Methods

A mixed-method systematic review of RCTs meeting the study inclusion criteria was undertaken. Eight databases were electronically searched up to September 2017. Participants' characteristics, intervention features, and outcome data were retrieved. The mean difference and standardized mean difference with 95% confidence intervals (CI) were synthesized to pool the effect size.

Results

A total of 13 articles from 11 RCTs were identified from 2,204 articles, of which 9 studies were included in the meta-analysis. Risk of bias was relatively high in allocation concealment and blinding. Social robots appeared to have positive impacts on agitation, anxiety, and quality of life for older adults but no statistical significance was found in the meta-analysis. However, results from a narrative review indicated that social robot interactions could improve engagement, interaction, and stress indicators, as well as reduce loneliness and the use of medications for older adults.

Discussion and Implications

Social robots appear to have the potential to improve the well-being of older adults, but conclusions are limited due to the lack of high-quality studies. More RCTs are recommended with larger sample sizes and rigorous study designs.

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Social Robot - CUDDLER

- Moyle, W., Jones, C., Sung, B., Bramble, M., O'Dwyer, S., Blumenstein, M., & Estivill-Castro, V. (2016). What effect does an animal robot called CuDDler have on the engagement and emotional responses of older people with dementia? A pilot feasibility study. *International Journal of Social Robotics, 8*(1), 145-156. DOI: 10.1007/s12369-015-0326-7

Health Technologies – Virtual Forest

- Moyle, W., Jones, C., Dwan, T., & Petrovich, T. (2018). Effectiveness of a Virtual Reality Forest on people with dementia: A mixed methods pilot study. *The Gerontologist, 58*(3), 478-487. DOI: 10.1093/geront/gnw270

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Enablers & Barriers – Adoption & Implementation

- Substitution of human care
  - replace the essence of social & physical human to hum interactions?
  - intuitive to react to unpredictable event associated with aged care?
  - over reliance or use?
  - emotional attachment?
  - increase disorientation in people living with dementia?
- Ethical considerations – deception & dignity
- Knowledge and attitudes – end users, family and health professionals
  - replacement, change, advanced technology, ongoing cost/support
- Development – user centric focused
- Cost effectiveness
- True efficacy – individualised? person-centred?

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Mentor: Professor Wendy Moyle

"As our life expectancy continues to be extended, the world faces a new and growing challenge - dementia. Professor Wendy Moyle's research on the use of robots as a therapeutic tool could change the face of dementia care globally, while also allowing people to stay in their own homes longer."

In 2020, named one of the World's 50 Most Renowned Women in Robotics in Analytics Insight magazine.

In 2019, named one of 30 women in robotics you need to know about by Robohub a US not-for-profit company.

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