

TECHNOLOGY SUPPORTED AGING-IN-PLACE: FROM INFORMATION COMMUNICATION TECHNOLOGY TO ASSISTIVE ROBOTICS

SAJAY ARTHANAT, PHD., OTR/L., ATP

PROFESSOR

DEPARTMENT OF OCCUPATIONAL THERAPY

UNIVERSITY OF NEW HAMPSHIRE



AGE OF CHAMPIONS, 2022

OVERVIEW

Highlight three research studies that demonstrate the role of innovative technologies to promote aging-in-place

1. Information Communication Technology (ICT) training program for older adults at risk of transition to long-term care [2015-2019]
2. Home automation technology to support care partners of individuals with Alzheimer's disease & dementia [2018-2020]
3. Development of a Social Assistive Robot (SAR) for care of individuals with Alzheimer's disease & dementia [2019-Ongoing]

BACKGROUND

Scope of technology mediated aging-in-place

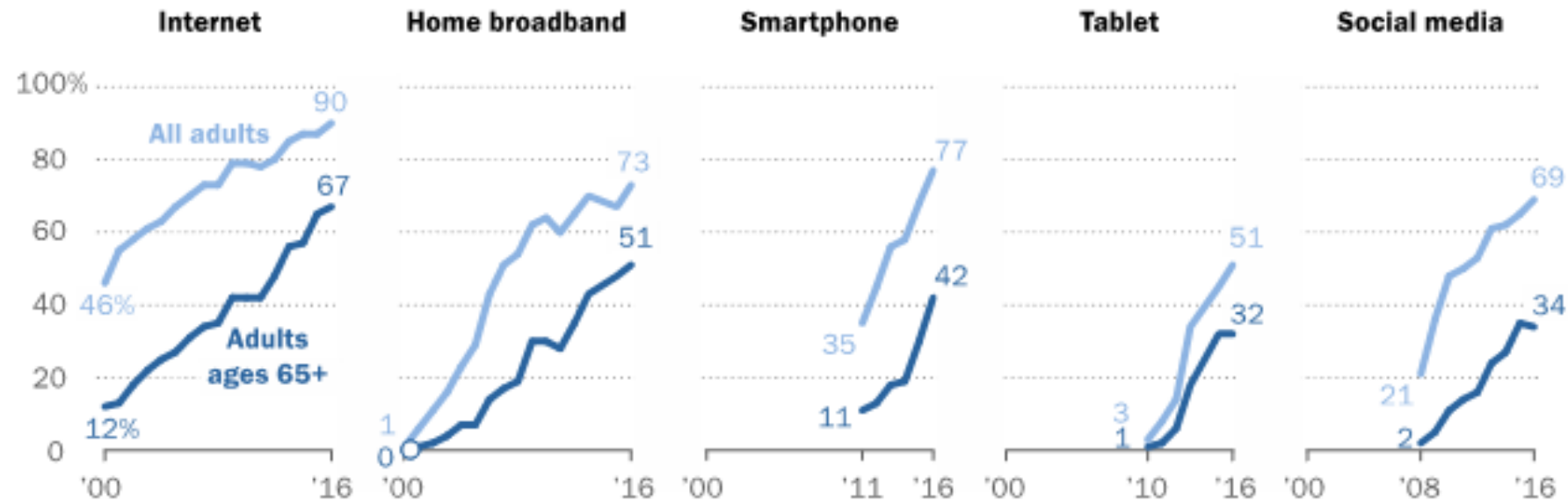
- Social Connectedness
- Health Management
- Personal Safety
- Leisure
- Independent and Community Living Skills



Addressing the Digital Divide

Smartphone adoption among seniors has nearly quadrupled in the last five years

% of U.S. adults who say they have or use the following



Source: Survey conducted Sept. 29-Nov. 6, 2016. Trend data are from previous Pew Research Center surveys.

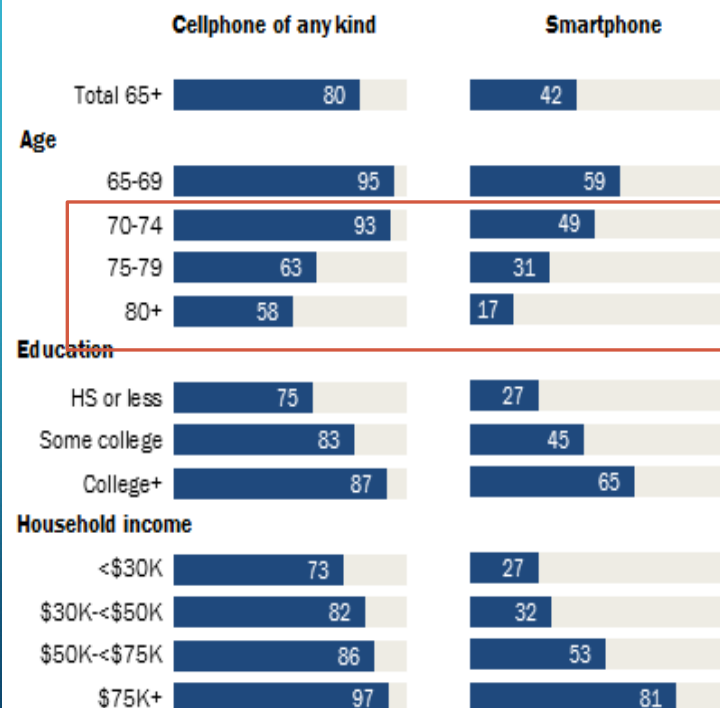
"Tech Adoption Climbs Among Older Adults"

PEW RESEARCH CENTER

Addressing the Digital Divide

Roughly four-in-ten seniors are smartphone owners

% of U.S. adults ages 65 and older who say they own the following ...

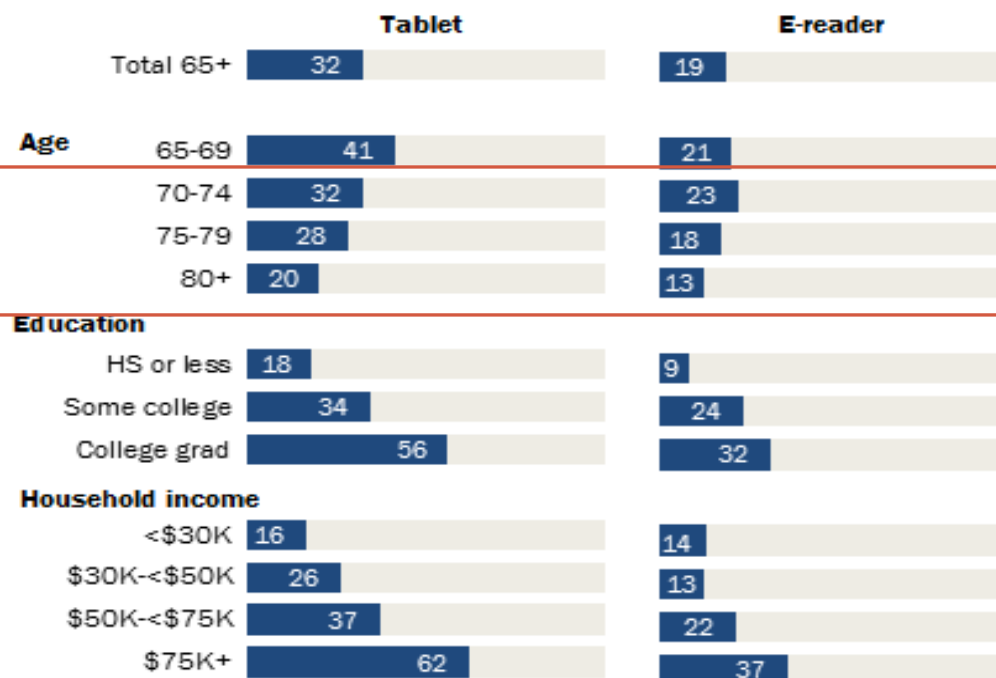


Source: Survey conducted Sept. 29-Nov. 6, 2016.
"Tech Adoption Climbs Among Older Adults"

PEW RESEARCH CENTER

Among seniors, roughly a third own tablets and a fifth own e-readers

% of U.S. adults ages 65 and older who say they own the following ...

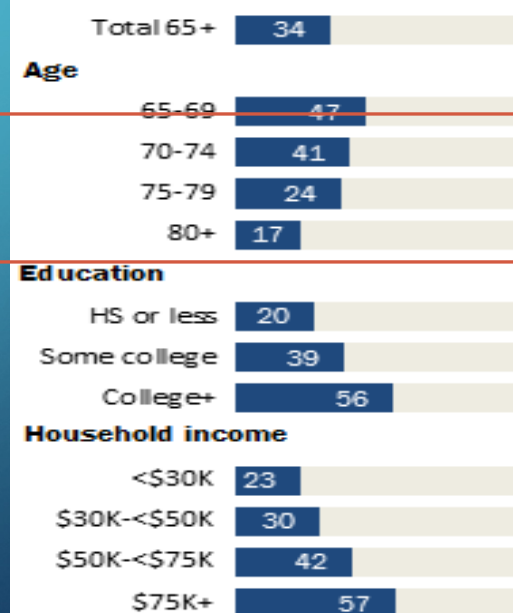


Source: Survey conducted Sept. 29-Nov. 6, 2016.
"Tech Adoption Climbs Among Older Adults"

PEW RESEARCH CENTER

Around a third of seniors report using social media

% of U.S. adults ages 65 and older who say they ever use social networking sites



Source: Survey conducted Sept. 29-Nov. 6, 2016.
"Tech Adoption Climbs Among Older Adults"

PEW RESEARCH CENTER

TURNING THE CHALLENGE INTO OPPORTUNITY

Rapid Growth of:

- Broadband Internet
- IoTs (Smart devices and wearables)
- Telehealth Technologies
- Semi-autonomous driving
- Artificial Intelligence & Machine Learning

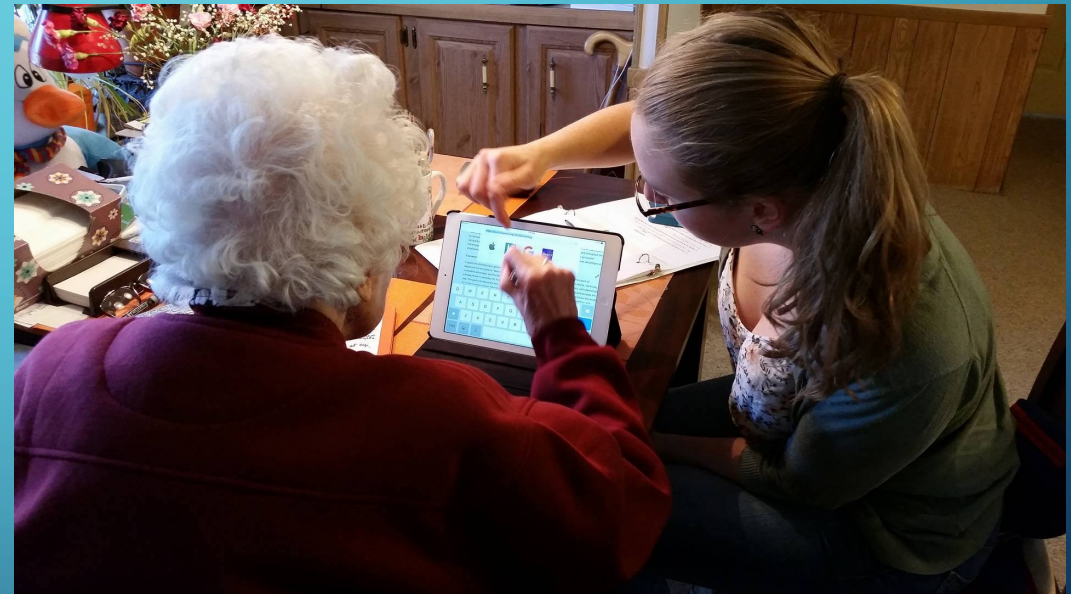
Tapping the potential: “Dual Impact”

Seniors

- 70-75 & Above
- Living alone
- Living in rural areas
- Lower socio-economic status
- With a disability or chronic condition
- Care partners

Study I: Individualized Community and Home-based Technology Training (i-CHATT)

- One-on-one
- Home-based
- Individualized
- Inter-generational



For more information: <https://ichatt.unh.edu/>

TRAINING PROTOCOL

3-Month Training Program

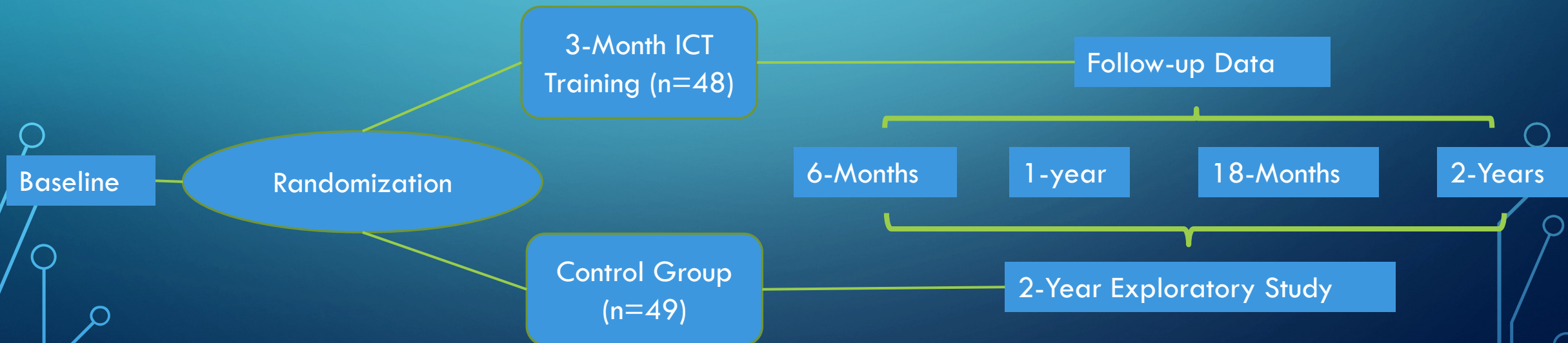
- Participant paired with “student coaches”
- Orientation and an activity priority list completed
- Long term goals (activity-based) and short-term goals (skill-based and application-based) chosen
- Student coaches conduct 3 home visits
 - Increase operational know-how and access to day-to-day ICTs
 - Create individualized lesson plans in accordance to priority checklist
 - Monitor progress with goals
 - Address ongoing questions and concerns
 - Scheduled check-ins

Study I: Individualized Community and Home-based Technology Training (i-CHATT): TWO-YEAR RCT

Participants (65+) who met our at-risk / low profile ICT inclusion criteria

Recruited from various community agencies

Staggered design: N~15 in each training cohort and control group x 3



Study I: Individualized Community and Home-based Technology Training (i-CHATT): TWO-YEAR RCT

RESULTS

Over the 2-year follow-up period, compared to the subjects in the control group, the training group subjects significantly...

Performed more activities using ICT	Expressed greater independence in...	Expressed acceptance of ICT on measures of...
<ul style="list-style-type: none">• Instrumental Activities (#17)• Health Management (#11)• Leisure (#12)	<ul style="list-style-type: none">• Online Shopping• Volunteering• Leisure• Family Connections• Social Connections	<ul style="list-style-type: none">• Readiness• Comfort• Satisfaction
Mixed Repeated Measures of ANOVA F (4,1)		

Study II: Home automation technology to support care partners of individuals with Alzheimer's disease & dementia



Study II: Home automation technology to support care partners of individuals with Alzheimer's disease & dementia

Adapt and implement mainstream home automation technology specific to support the needs of care partners

Goals are centered on:

- Care recipient engagement and routines
- Monitoring and home safety
- Emergency response and assistance
- Care partner autonomy

Study II: Home automation technology to support care partners of individuals with Alzheimer's disease & dementia

Themes from case studies

Unfamiliarity

"I'm not good with this kind of stuff"

"Installation and set-up is just really frustrating and not fun to go through."

"It is like the Apple Vs PC! Its scary!. We won't know if we go out and buy something. What if we end up with a bunch of things that won't work together"

"All depends on where you are in your progression with the disease"

"I'm now familiar with the TV, the stove, the lights. I use them automatically without thinking, and I better be able to handle these devices the same way before I lose it."

Timing

"My schedule used to be his schedule, and now this has allowed me better use of my own time."

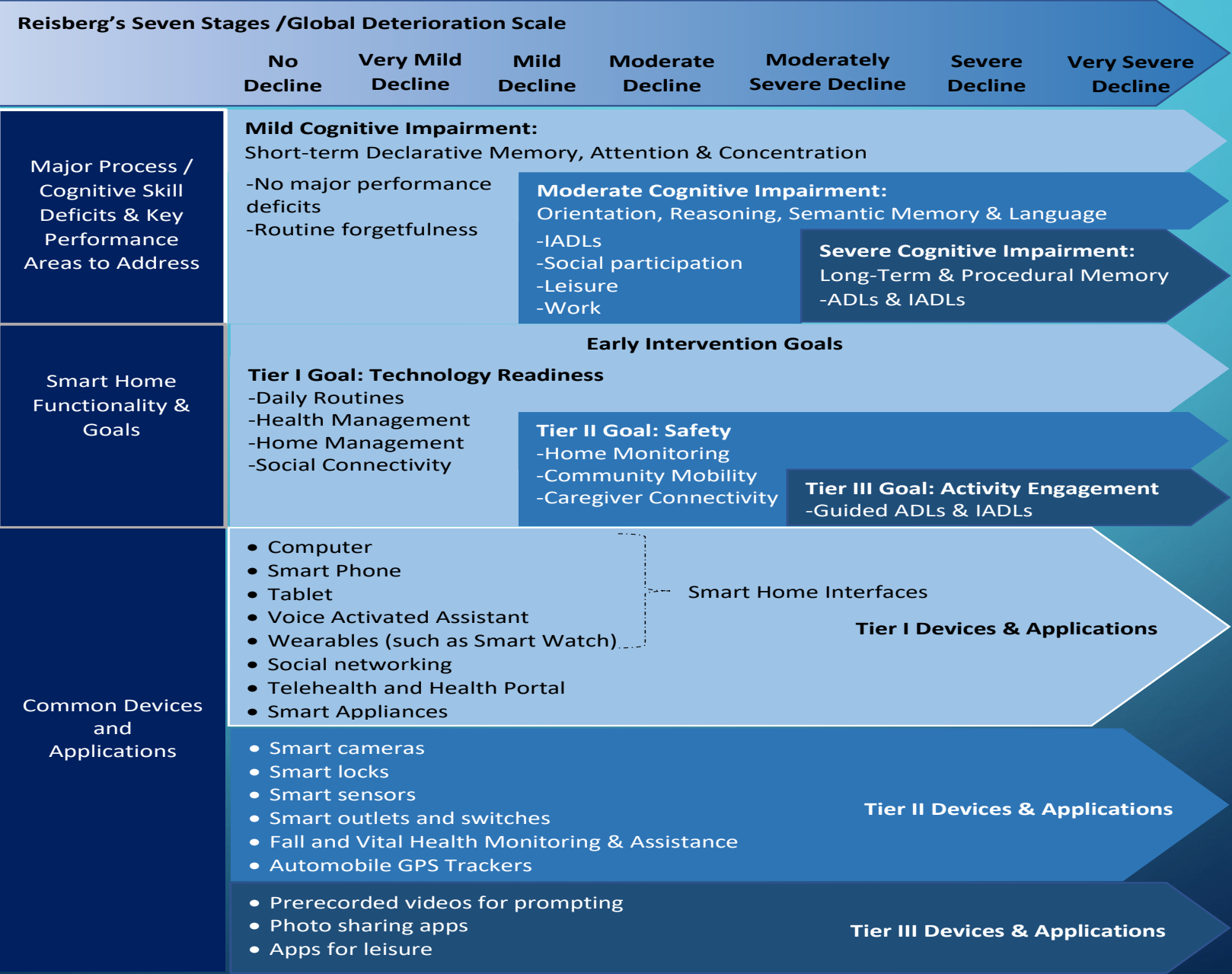
"Before he never hydrated during the day and now he drinks a little bit of water each time he is reminded".

Value

"...I do get things done on my own"

"I went ahead and purchased a second echo helpful at the time of my mother's diagnosis, if a doctor or social worker told us here are five things that will be useful going forward."

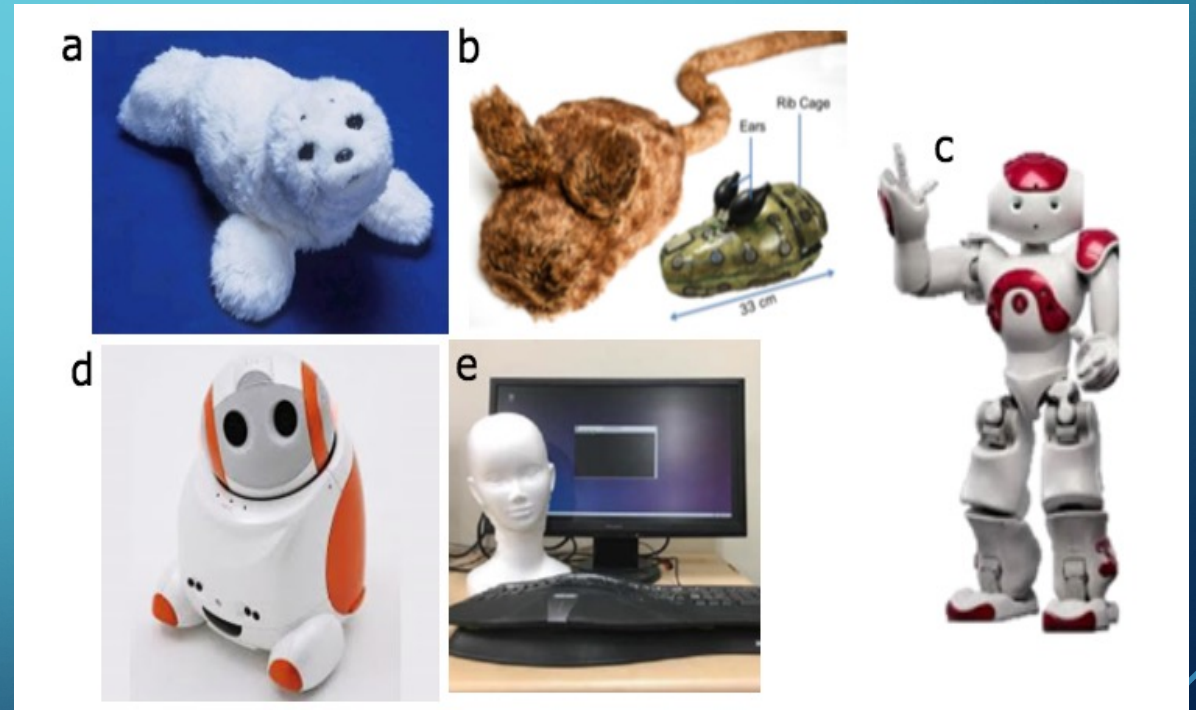
Figure: Smart Home Automation Early Intervention Framework to Support ADRD Caregiving



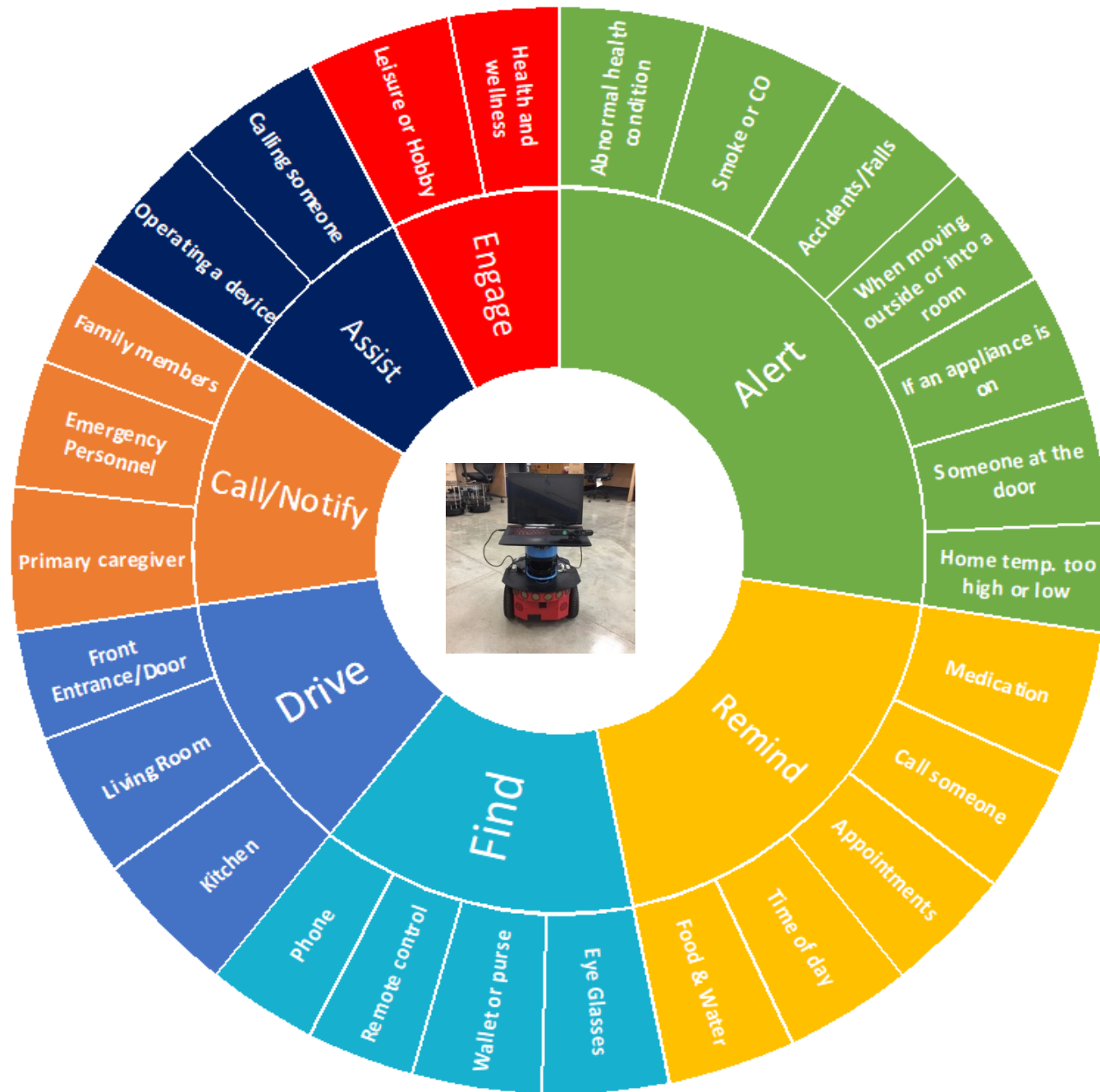
STUDY III: Development of a Social Assistive Robot (SAR) for care of individuals with Alzheimer's disease & dementia

Future of Care (What can SARs do?)

- Offer companionship
- Help engage in routines
- Safety and emergency response
- Remain linked with the care partner or family



[Work in Progress: A short video](#)



Thanks / Questions

Acknowledgement & Thanks:

UNH- Occupational Therapy Students

UNH- Center for Aging & Community Living



For Information:

Sajay.arthanat@unh.edu

AGE OF CHAMPIONS, 2022

