Guest Lecture:

HCI & Healthcare

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HCI Course - 8 July 2024
FA Universität Erlangen

Dr. Isabel Schwaninger

- 2008-2011 BA in Chinese Studies (Uni Wien)
- 2008-2014 Mag. in International Development (Uni Wien)
  stays abroad in China, Taiwan
- 2015-2020 BSc in Software & Information Engineering (TU Wien)
- 2018- 2022 **PhD in HCI, Faculty of Informatics, TrustRobots Doctoral College, TU Wien**
  Project Work in AAL projects e.g. eHealth Literacy, Telemonitoring; Visit at Fraunhofer AICOS (Porto)
- 2022- **Postdoctoral Researcher at the Digital Medicine Group**, Luxembourg Center for Systems Biomedicine, University of Luxembourg
- Work Experience e.g. in International Affairs (2015), Teaching at a Chinese School (2015-2017), Natural Language Processing & NN (2017-2018)

Overview

- HCI & Healthcare Basics
- Assistive Technology
- Perspectives on Ageing
- Case Studies HCI with Older Adults in Europe & East Asia

HCI & Healthcare Basics

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CHL Centre Hospitalier de Luxembourg
LUXEMBOURG INSTITUTE OF HEALTH RESEARCH DEDICATED TO LIFE
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Context of HCI in Healthcare

Informal Settings

In Institution

At Home

Professional Care Networks

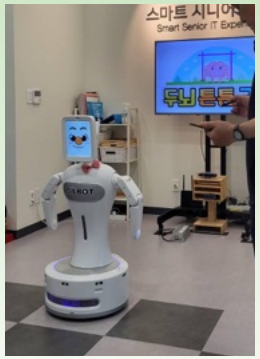
Informal Care Networks

Digital Medicine

Active & Assisted Living

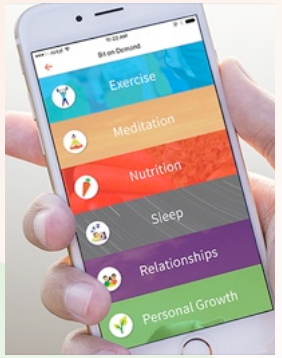
Health & Wellbeing

Digital Medical Devices



Assistive Technologies

Self-care Technologies



Professional Settings

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Terminology

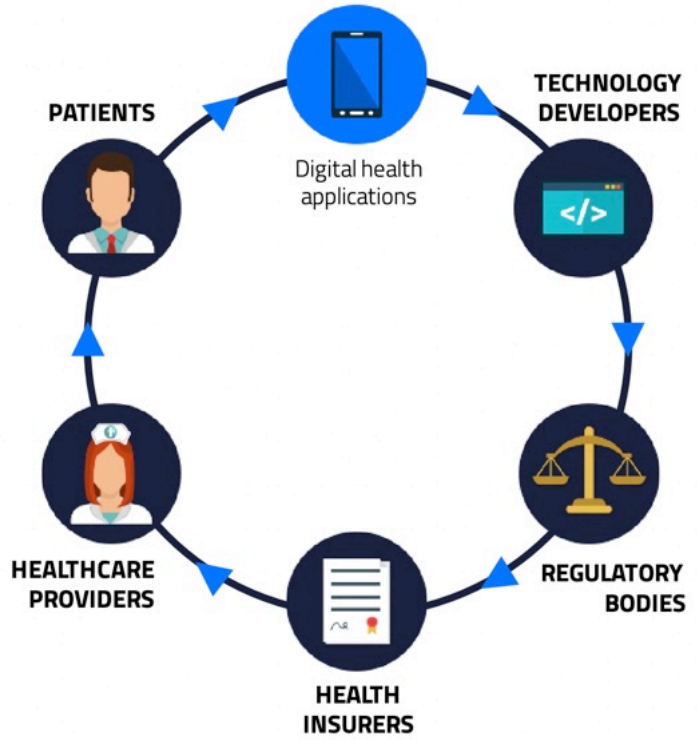
- **Health:** *A state of complete **physical, mental and social well-being** and not merely the absence of disease or infirmity (WHO, 2024)*

- **Wellbeing:** *A positive state **experienced** by individuals and societies. Similar to health, it is a resource for daily life and is **determined by social, economic and environmental conditions**. Well-being encompasses **quality of life** and the ability of people and societies to **contribute to the world** with a sense of **meaning and purpose**. Focusing on well-being supports the tracking of the equitable distribution of resources, overall thriving and sustainability. A society's well-being can be determined by the extent to which it is resilient, builds capacity for action, and is prepared to transcend challenges (WHO, 2024a)*

- **Medicine:** *The science and art of **diagnosing and treating disease** or injury and maintaining health.*

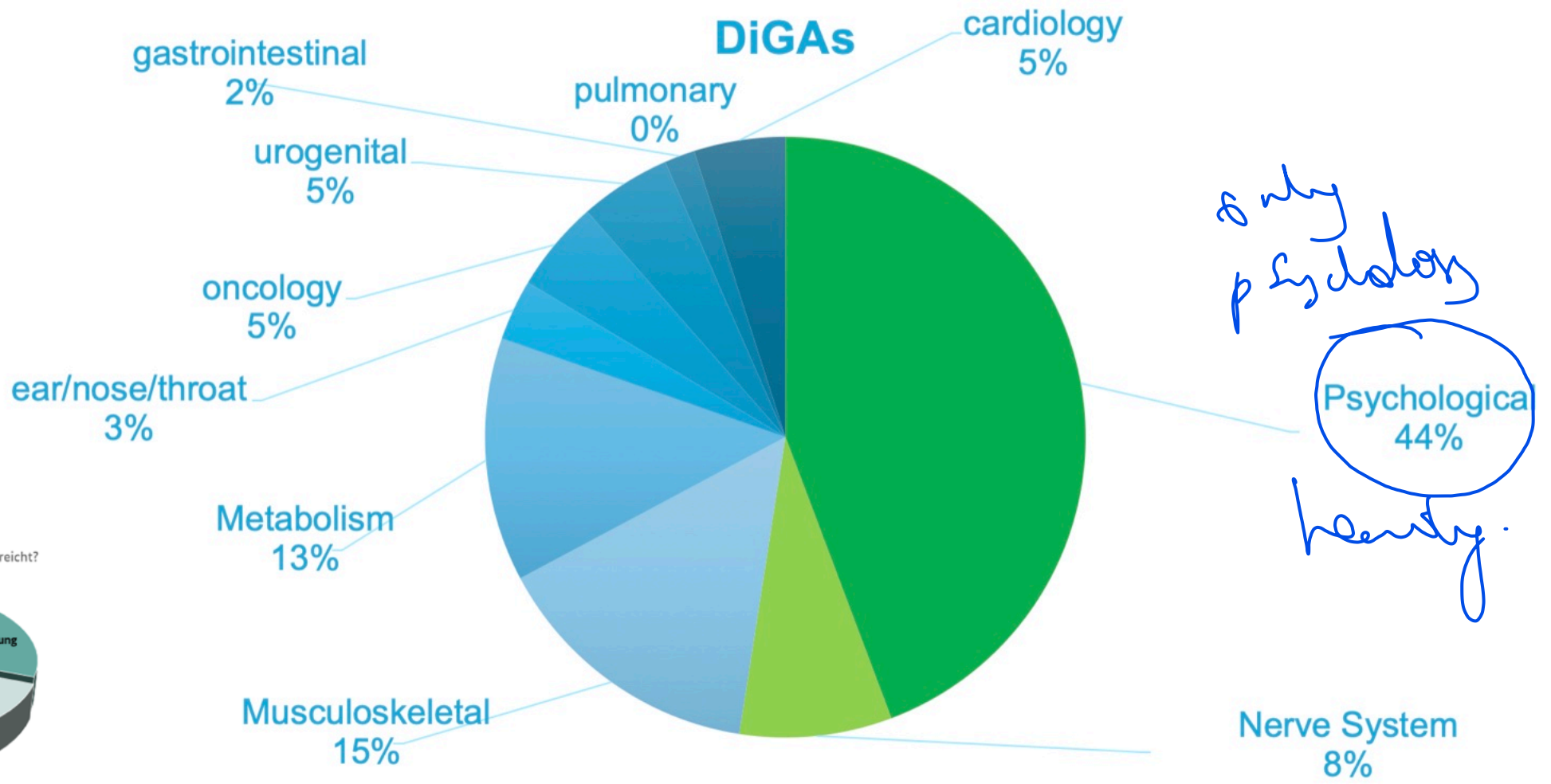
Digital Health in the Medical Context

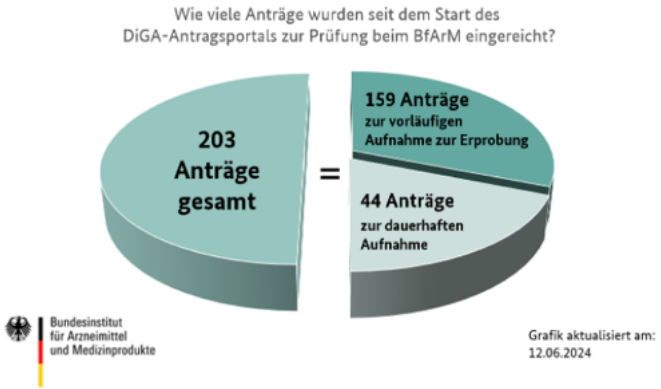
- Digital medical devices to **recognise, monitor, treat, alleviate diseases and injuries**
- Over 350.000 mobile health applications available in major app stores
- Apps mostly not regulated or certified
- 2019: Digital Healthcare Act in Germany - “apps on prescription”, **DiGa (*Digitale Gesundheitsanwendungen*)**, reimbursement by statutory health insurers - national variations in other countries
- **Certification** of devices - standards of safety, functionality, quality, data protection, data security, interoperability requirements



DiGa Stakeholders

64 DiGa - listed (June 2024)





DiGa Implementation

- Implementation ongoing, national variations
- **Health technology assessment (HTA)** to support WHO member states in health intervention and technology assessment mechanisms
- **Barriers of DiGa implementation** concerning primary, secondary, tertiary users
  - Low adoption due to limited awareness among patients and healthcare professionals (HCPs); challenges in the activation process
  - Lack of remuneration for HCPs for lengthy prescription process; high pricing for payers
- Requires **multi-stakeholder engagement**, **awareness**, **user-friendly design**, definition of user values (empowerment), evidence of values and usability, etc.
- Ongoing research project on user quality criteria in major app stores

Assistive Technology

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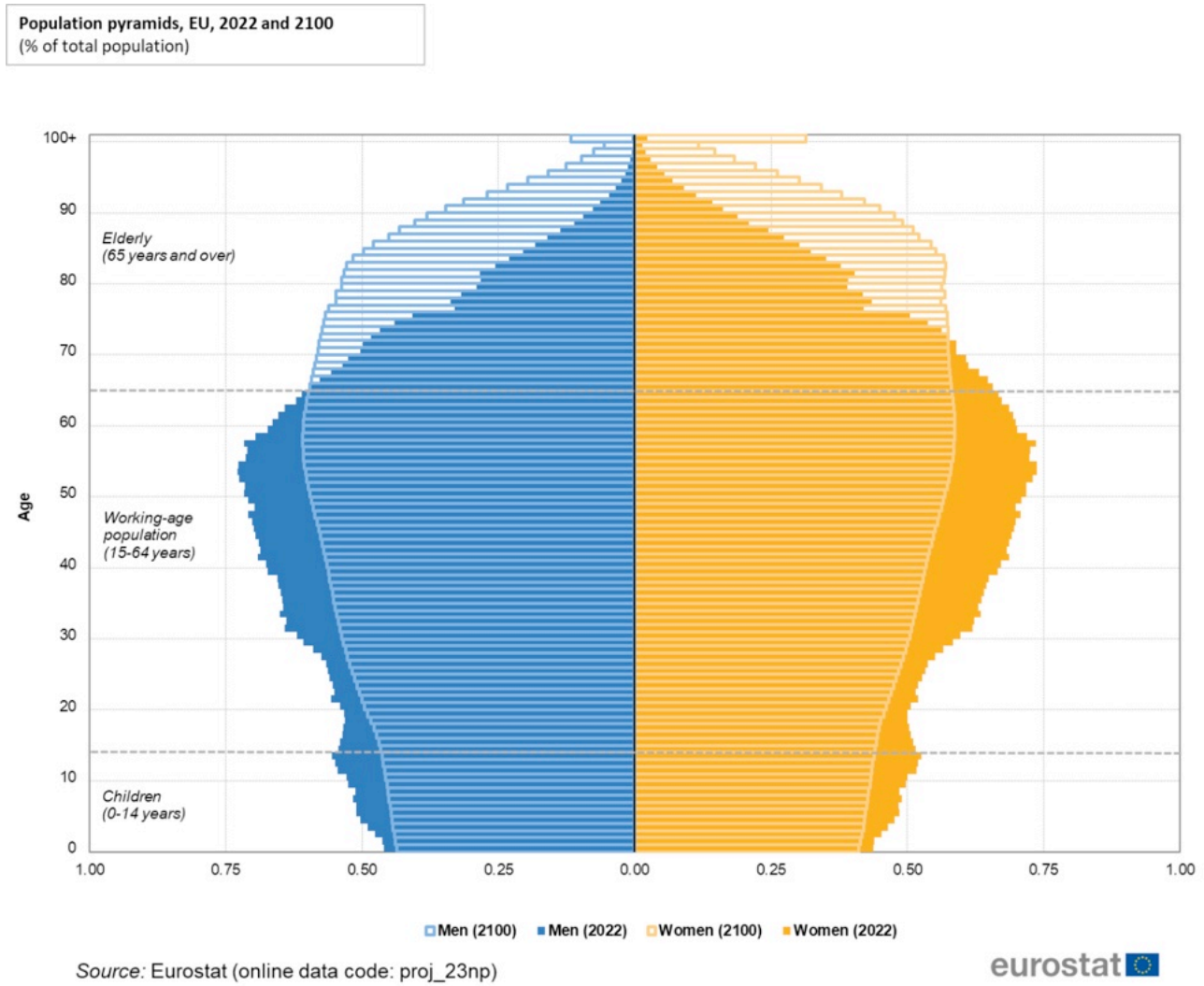
Demographic Changes as a Driver



- More people living with **chronic diseases** as a consequence
- Digital health technology and assistive technology as proposed solutions
- Digital health technology to be **integrated** into healthcare procedures

Ageing in Place

- Growing older *at home*
- In Western societies, many older adults want to age-in-place
- Remain in homes and communities
- Ability to remain in one's home or community contributes to older person's **wellbeing**
- This includes being able to have any **services or support** people might need over time as their **needs change**
- Assistive technology to meet challenges associated with the ageing population in particular, support older people in their **independent living**, support formal and informal care and people who provide care (formal & informal caregivers)

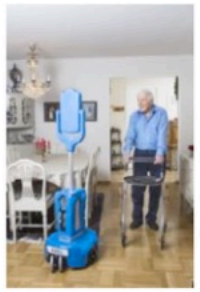
Four Generations of Assistive Technology

1st Generation

2nd Generation

3rd Generation

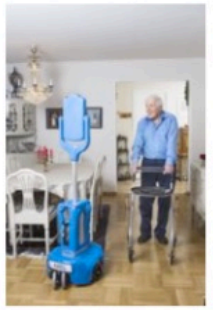
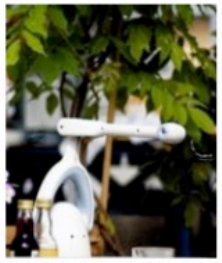
4th Generation



Robot Puppy

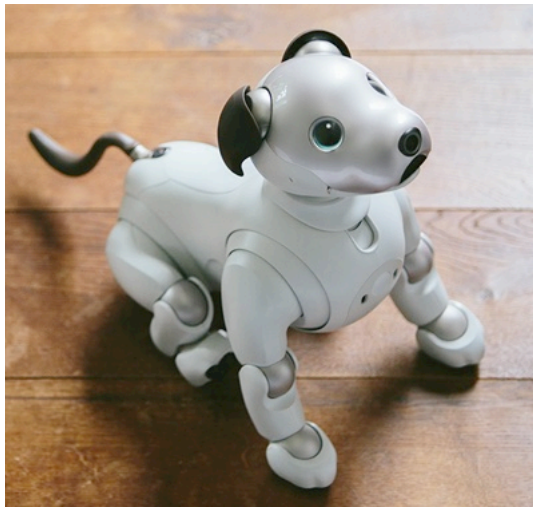
Blackman et al., 2015; Schwaninger, 2022

Assistive Robots

				
Robotic Mobility Aid Friend II	Fetch & Carry Support Botlr	Robotic Manip. Aid Asibot	Rehabilitation Robot Auto Ambulator	Telepresence Robot Giraff
				
Personal Care Robot Bestic	Household Robot Scooba	Companion Robot Hector	Emotional Robot Paro	Entertainment Robot Ifbot

Source: Werner et al. (2015)

Assistive Robots



us.aibo.com

fp-robotics.com

soarkledesign.nl

Robots for Active and Assisted Living

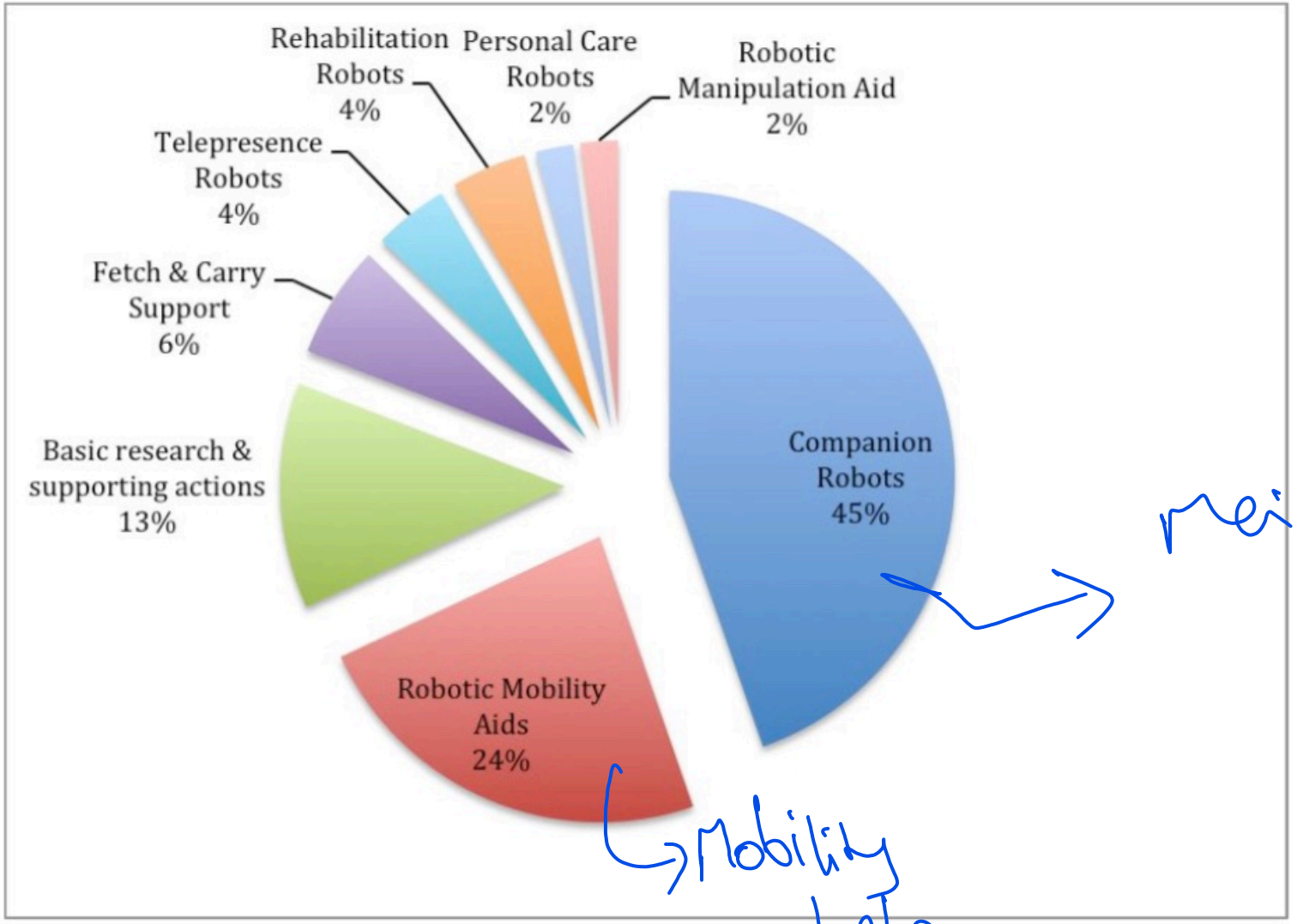
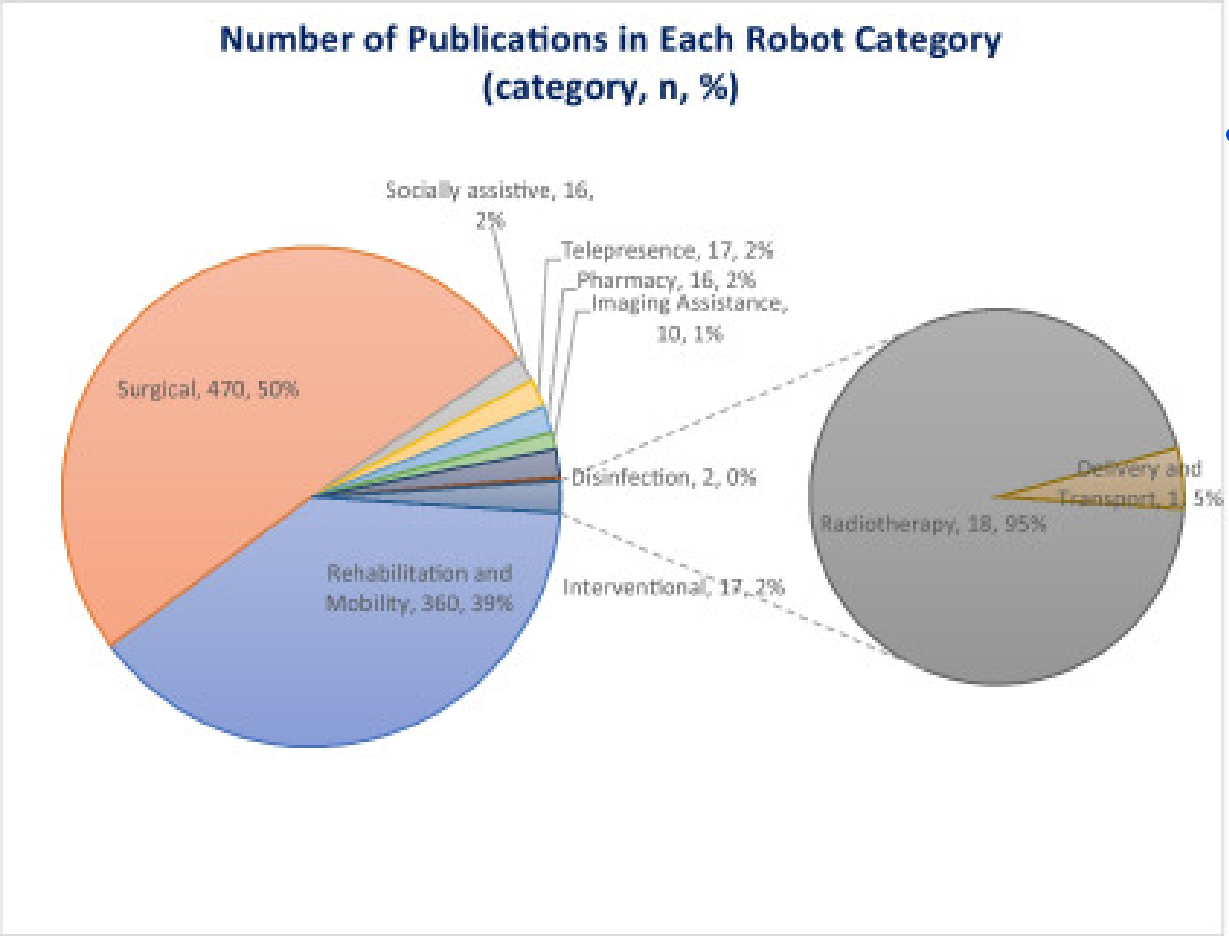


Fig. 8. Analysis of AAL robot research by robot categories

Source: Werner et al. (2015)

Healthcare Robots by Category



Raw data:

Robot Group	Number of Studies
Rehabilitation and Mobility	360
Surgical	470
Socially assistive	16
Telepresence	17
Pharmacy	16
Imaging Assistance	10
Interventional	17
Disinfection	2
Radiotherapy	18
Delivery and Transport	1

Morgan, A. A., Abdi, J., Syed, M. A. Q., Kohen, G. E., Barlow, P., & Vizcaychipi, M. P. (2022). Robots in Healthcare: a Scoping Review. Current Robotics Reports, 3(4), 271. doi: 10.1007/s43154-022-00095-4

Emotional Robot “Paro”

- Used in institutional care of older adults with dementia
- Influence on people’s emotional regulation
- Enhanced social interaction

journalofdementiacare.com

(Social) Robots

- Functional and social tasks in care
- Can provide companionship
- Facilitating human to human connectedness
- See case study later in this presentation

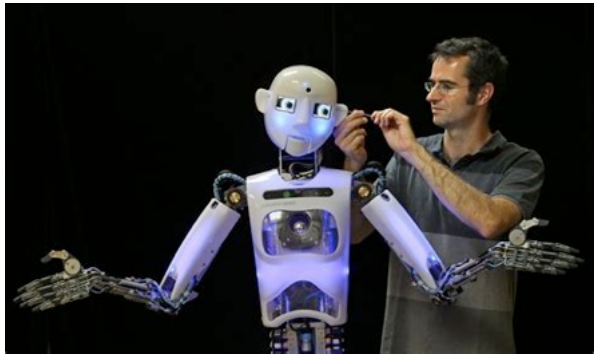
Human-Robot Interaction (HRI) as a Research Field

- Human-Robot Interaction (HRI) is a field of study dedicated to understanding, designing, and evaluating robotic systems for use by or with humans.

- **Remote HRI:** humans and robots spatially, temporarily separated
- **Proximate HRI**: humans and robots co-located

1: Introduction | Human-Robot Interaction. (2024, June 05). Retrieved from https://humanrobotinteraction.org/1-introduction

Robot-centered HRI



- Improve Safety
- Reliability
- Integrate sensors
- …

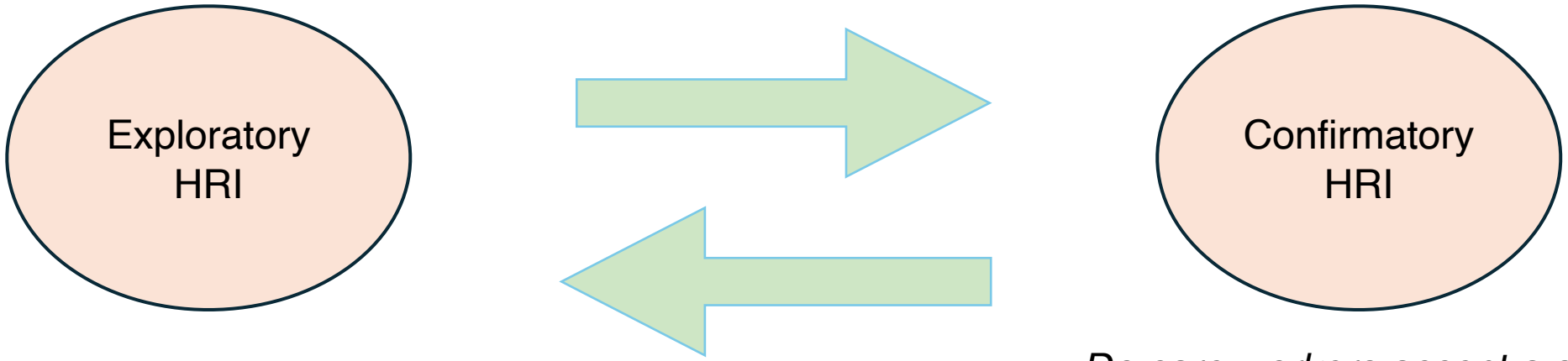
Human-centered HRI

- Robots in social contexts
- Perceived safety
- User and institutional requirements
- …

HRI User Studies

Open-ended questions

Hypothesis-driven



What factors contribute to older people trusting a robot?

How do people interact with a social robot in public space?

etc.

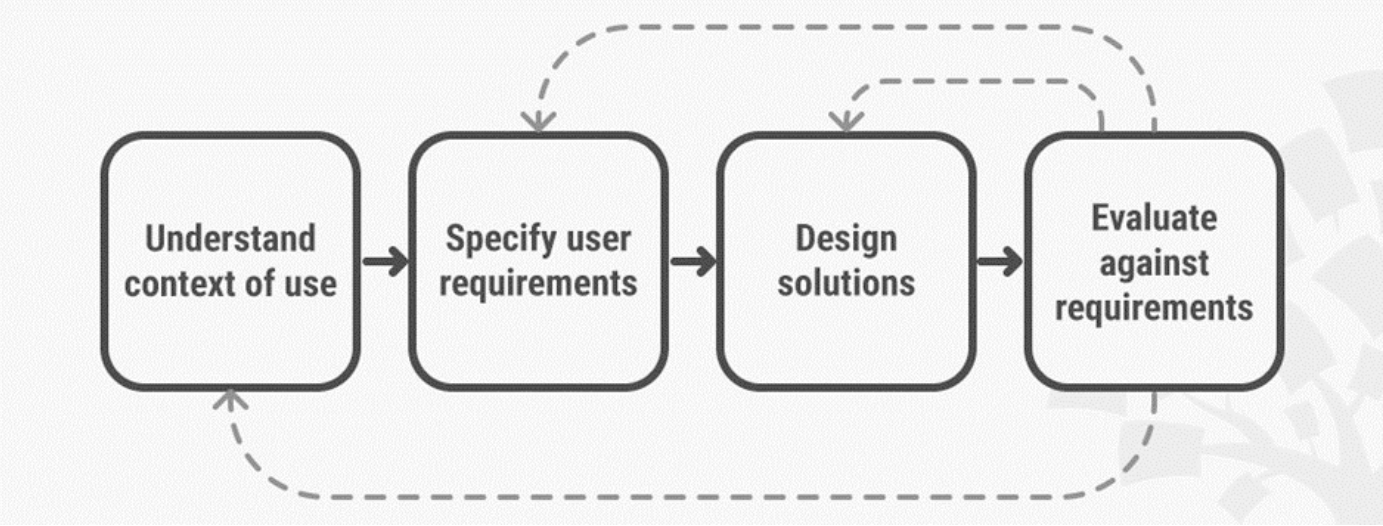
Do care workers accept a social robot in a care setting?

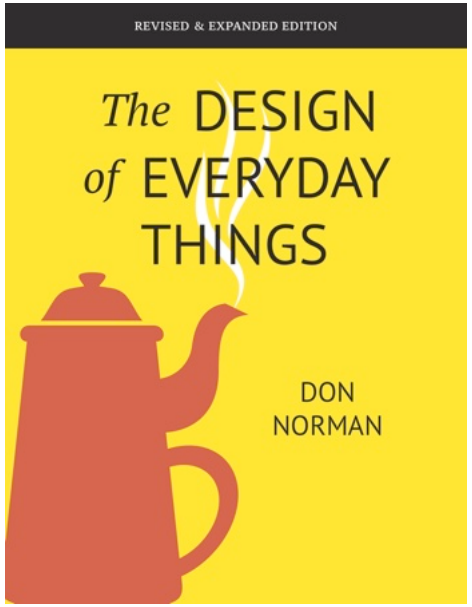
Does robot performance lead to enhanced trust?

etc.

User-Centered Design (UCD)

- **Iterative** process
- **Investigative methods** and **generative methods**
- Methodological challenges to conduct **UCD in HRI**





Book recommendation

UCD Challenges for Robots and Assistive Technology

- Most people have never seen a robot - engaging people in imaginary futures requires **creative methodological approaches**
- Robots cannot be as easily **prototyped** as a screen in traditional HCI
- UCD method skills, designers, engineers, etc. - **multidisciplinary teams** required to work together
- Older adults as **vulnerable group** of participants / target users
- Aim for **empowerment** of older adults vs. agist views prevalent, concept of ageing often seen as 'decline'

Who are the users?
Perspectives on ageing

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Perspectives on “Ageing”

What does “old” age mean?

What does it mean to get old?

Perspectives on Ageing (Harley, 2010)

Cultural aspects:

- Eastern notions: Filial piety / respect for older people, old age as a source of wisdom
- Western notions: “old age is a disease” (Seneca, 4 BC - AD 65)

A. Ageing as Decline

B. Ageing as Adaptation

C. The “New Ageing”

A. Ageing as Decline

Modern western perspectives

Ageing as Decline:

Ageing as an accumulation of loss.

- The biomedical model
- Cognitive ageing
- Social perspectives on ageing: activity versus disengagement

Bio-Medical Model

- Physical / biological aspects of ageing - important in medical contexts to treat symptoms
- Ageing an inherent aspect of all living organisms
- Increasing cellular “mistakes” through lifespan increase our susceptibility to physiological stress — ultimately death
- Ageing as a form of dysfunction or ‘pathology’

Cognitive Ageing

- Concerned with ability to process information
- Grounded in ideas from Neurobiology
- Losses to cognitive capacity: memory, attention

Social Models of Ageing

Activity Theory (Cavan et al., 1959; Havighusrst and Albrecht, 1953)

- Individual decline intrinsically linked to loss of participation in social roles beyond retirement
- Ageing adults who engage in daily activities that they perceive productive age successfully
- Value of social interactions in ageing gracefully

Disengagement Theory (Cumming and Henry, 1961)

- Increasing social withdrawal with age is a “natural" and healthy aspect of ageing for individuals and society
- Death is imminent - retreat

Problems with Theories of Ageing

Emphasis on

- **Deficits** of ageing - needed in medical interventions but can have negative side effects
- Older people as **passive recipients of social and medical intervention**
- **Ignore individual adaptations** and **subjective experience**

… The Wellbeing Paradox (Mroczek & Kolarz, 1998):
Life satisfaction and measures of wellbeing actually increase as we get older

B. Ageing as Adaptation

Ageing as Adaptation

- Erikson's Stage Model of Life Span Development
- Selectivity with Optimisation and Compensation
- Continuity Theory
- Socioemotional Selectivity
- Gerotranscendence

Life Span Theories

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Life Span Development: Adapting one's identity…

…in line with one's life stage (Erik Erikson)

Stage	Approximate Age	Nature of conflict	Virtues gained through resolution of conflict
Infancy	Birth to 1 year	Trust versus Mistrust	Hope
Early Childhood	1 to 3 years	Autonomy versus Shame and Doubt	Will
Play Age	3 to 5 years	Initiative versus Guilt	Purpose
School Age	6 to puberty	Industry versus Inferiority	Competence
Adolescence	13 to 18	Identity versus Role Confusion	Fidelity
Young Adulthood	18 to 35	Intimacy and Solidarity versus Isolation	Love
Adulthood	35 to 55	Generativity versus Self-absorption and Stagnation	Care
Old Age	55 to death	Integrity versus Despair or Disgust	Wisdom

Harley, 2010

Adapting one's Identity

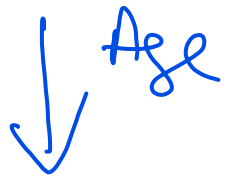
Life Review:

- central to old age
- Integrating the legacy of a life already lived, accepting the decisions one has made in one's life in terms of a greater wisdom
- Adaptation of the self to the social or outerworld

Cognitive Adaptation

Differentiating cognitive abilities: Fluid and Crystallised Intelligence (Cattell, 1987)

Fluid Intelligence: non-specific skills and abilities that allow one to deal with novel problems of life — declines beyond young adulthood

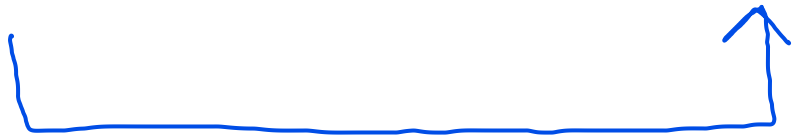


Crystallised intelligence: specific contextual knowledge accumulated through experience and education, peaks around 65 and then declines

Cognitive Adaptation

Selectivity with Optimisation and Compensation (Baltes and Baltes, 1990)

- Centrality of subjective experience
- Older people **balance the "deficits" or "losses"** of ageing by developing other capacities or **"gains"**
- They **compensate** for age-related declines in **fluid intelligence**



Continuity Theory (Atchley, 1989)

- A person's ability to **maintain their habits, preferences, lifestyle, relationships** as they age
- People try to **maintain continuity** between who they were and who they're becoming

- Linked to crystallised intelligence – a person takes their knowledge from the past and **applies it to future changes**

- Internal continuity - about personality traits
- External continuity - about the environment

Socioemotional Selectivity (Carstensen 1992)

- Perceived proximity of death for older people can affect their selectivity
- Increasing **emotionally meaningful and socially-oriented goals**
- Older people would **avoid superficial social contact** and seek **deepening intimacy**

Real > fake

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Gerotranscendence (Tornstam, 2005)

- Subjective experience of older people
- Redefinition of self that continues to take place

- Adaptation through self-transcendence

Gerotranscendence (Tornstam, 2005)

Gerotranscendence - Joan Erikson's extra ninth stage

"The individual becomes, for example, less self occupied and at the same time more selective in the choice of social and other activities. There is an ***increased feeling of affinity with past generations*** *and a* ***decreased interest in superfluous social interaction****. The individual might also experience a decreased interest in material things and a greater need for* ***solitary "meditation"****. Positive solitude becomes more important. There is also often a feeling of cosmic communion with the spirit of the universe, and a redefinition of time, space, life and death."*

Tornstam, 2005

C. The “New Ageing”

Contemporary Attitudes - the "New Ageing"

Postmodernism and the "New Ageing"

- Ageing populations with greater wealth, but cultures which promote:
  - **Materialism**: ageing as a disease, ageism, "anti-ageing"
  - **Productivity and busyness** - expectations of continued employment in retirement
  - **Individualism** - individual responsibility for care, increasing social isolation
  - **Consumerism** - "ageless consumers" who can choose their own lifestyle

Everyday Perspectives

In Western cultures:

Younger adults tend to think of older people as being ill, asexual or impotent, unattractive, suffering from physical and mental decline, useless, isolated, lonely, poor and depressed (Palmore, 1990)

Stereotypes affect the self-perception of individuals within the group — negative or positive… (Miller, 2019)

Healthy Ageing - WHO, 2020-2030

WHO: **Decade of Healthy Aging** (2020-2023)

*Healthy Aging is the process of **developing and maintaining the functional ability that enables wellbeing** in older age.*
(WHO, 2024b)

People's ability to:

* meet their basic needs;
* learn, grow and make decisions;
* bei mobile;
* build and maintain relationships;
* contribute to society

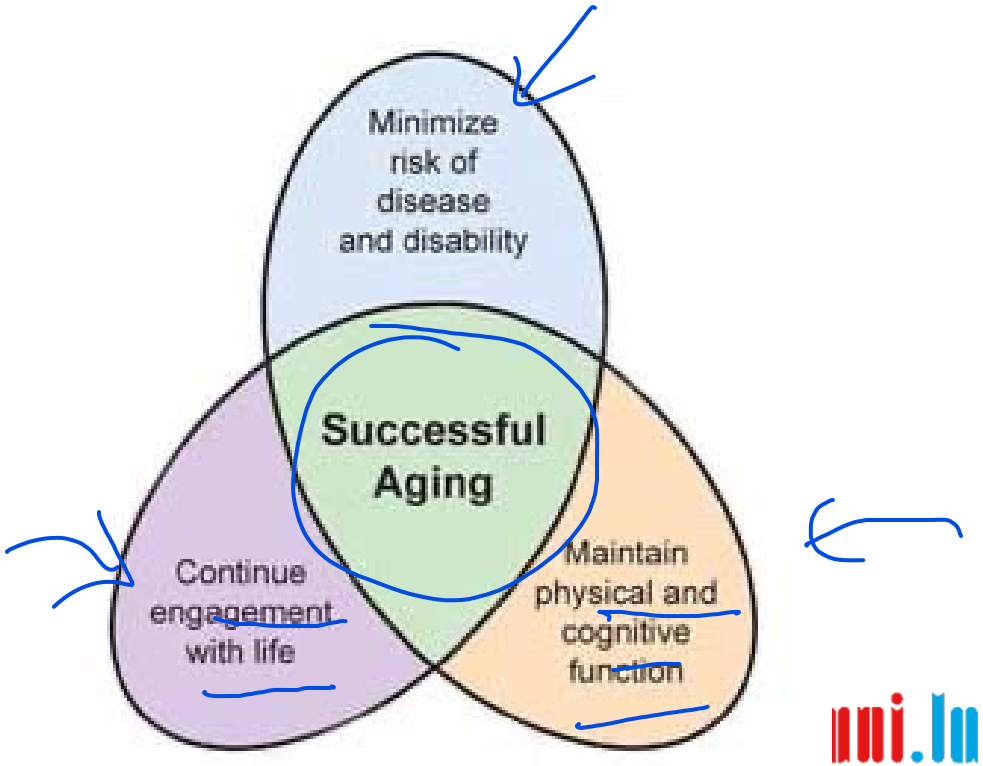
Replacing active aging:

"Active ageing is concerned with **facilitating the rights of older people to remain healthy** (reducing the costs of health and social care), **remain in employment longer** (reducing pension costs), while also **participating in community and political life**." (Foster and Walker, 2015)

Successful Ageing (Rowe and Kahn, 1998),

Proactive Approach - 3 elements:

- Reduction of disease and disability related to disease
- Maintenance of high cognitive and physical functioning
- Active engagement with life



Successful Ageing (Rowe and Kahn, 1998),

Problems:

- Normative views of what it means to age *successfully*
- Idealization of a "good" old age reflect Western values of independence, youthfulness, effectiveness, productivity
- White, middle-aged middle-class successful person —projection of values & behavioural patterns on old age
- Problematic because it prescribes how older adults *should* age, rather than seeking to understand and to describe how different people make meaning of their lives as they age (Harley, 2010)

Positive Ageing

Positive Ageing - associated terms:
active ageing, successful ageing, healthy ageing, productive ageing, competent ageing
(Foster and Walker, 2015)

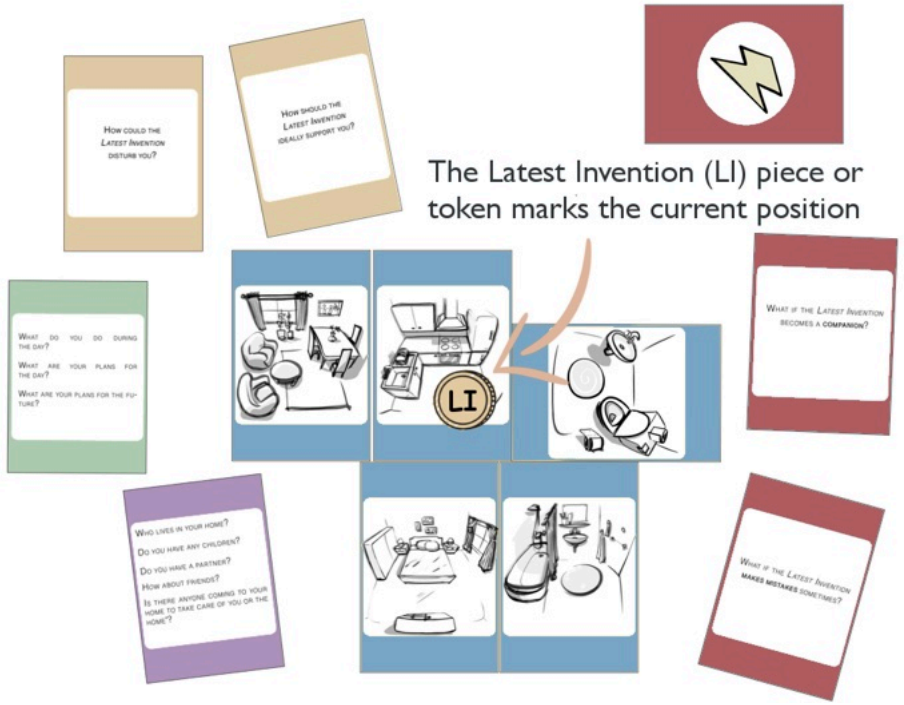
"*The process of maintaining a positive attitude, feeling good about yourself, keeping fit and healthy, and engaging fully in life as you age*". – Positive Psychology Institute, Australia

Perspectives on Ageing for HCI

- Impact on the **design** of digital health technology - system / user goals, features, relationships, etc.
- Assistive/health technology may **proscribe particular forms of ageing** by demanding identity and memory to **align user with system** - *should be the other way around*
- **Technology as enablers** for individual needs. Aging/lifespans as **adaptation - empowerment**, especially the more 'self-management' is required in healthcare (telehealth, etc.)
- Technology **embedded** in everyday context and relationships (homebound user vs social relationships outside home; of communication, positive ageing, consumerism, agism, etc.) - *holistic perspective*
- User research methods to **capture and design for needs** - *promote* adaptation, healthy aging, etc.

Case Studies

Case Study 1: Trust Cards



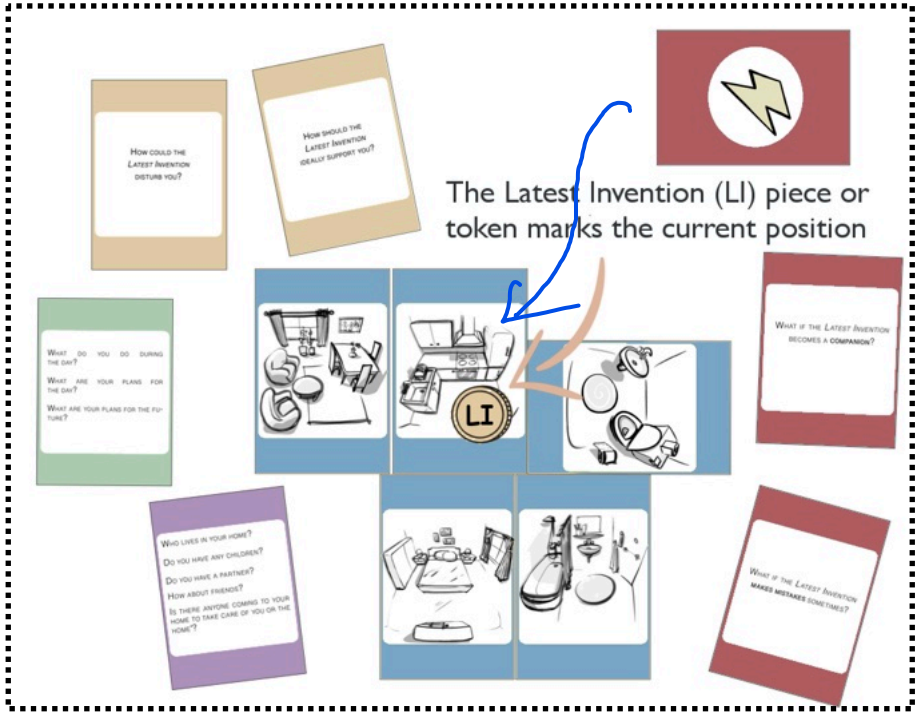
Schwaninger, I., Güldenpfennig, F., Weiss, A., & Fitzpatrick, G. (2021). What Do You Mean by Trust? Establishing Shared Meaning in Interdisciplinary Design for Assistive Technology. Int. J. Social Rob., 13(8), 1879–1897. doi: 10.1007/s12369-020-00742-w

Case Study: Trust Cards

- UCD methodological challenges in HRI
- **Card-based method** for shared understanding of everyday life of older adults
- 3 iterative phases of card design with 10 designers/ engineers, evaluation with 10 older adults
- Use of card deck to guide conversations and engage in **ideation** for assistive tech/robots

Case Study: Trust Cards

- **Floor plans** to guide discussion of individual context
- Questions on daily routines, daily goals
- Coin-shaped token (“latest invention”)
- Use provoking questions to facilitate imagination about robots in own living spaces
- Questions guided by trust concepts (reliance, interpersonal trust)



Case Study: Trust Cards

- Lack of trust in technology as a door-opener for conversations - learn about trust by discussing mistrust
- Openness of older adults for support in **household work** by a "latest invention"

- Privacy preferences depending on levels of intimacy at home (public rooms vs private rooms) - **adaptability**
- Value tensions: **Privacy - companionship**
- Transparency, privacy, control - foster autonomy and skills to support users' decision-making

Case Study 2: Video Connecting Families & Social Robots

Schwaninger, I., Carros, F., Weiss, A., Wulf, V., & Fitzpatrick, G. (2023). Video connecting families and social robots: from ideas to practices putting technology to work. Univ. Access Inf. Soc., 22(3), 931–943. doi: 10.1007/s10209-022-00901-y

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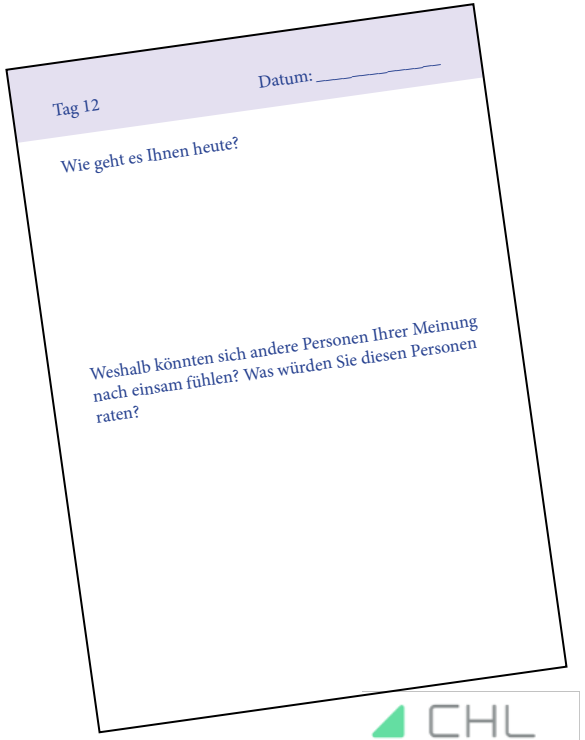
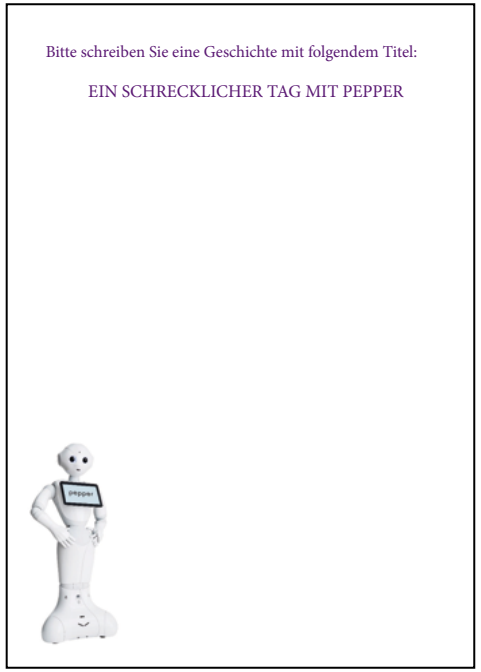
Case Study: Video connecting families & social robots

- Two institutional care homes
- Diary studies with residents during COVID-19 lockdown in 2020 (4 weeks)
- Remote interviews with 9 residents and 9 care workers

Diary Study





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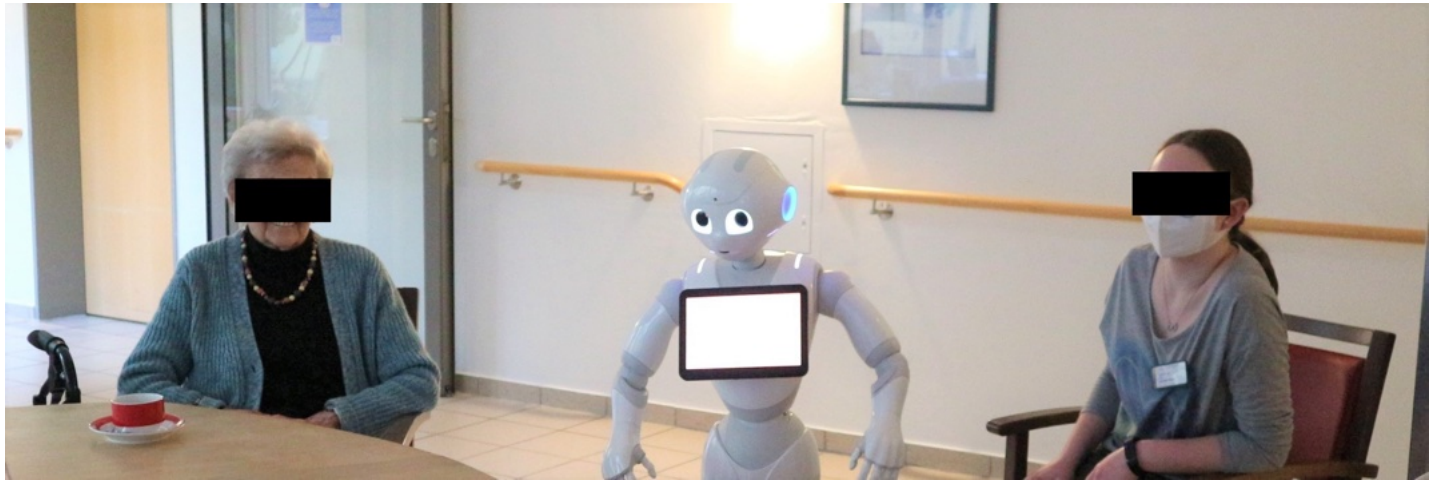
Case Study: Video connecting families & social robots

- Changes in technology usage triggered by pandemic experiences
- 10% of residents, acc. to care workers
- Digital literacy of residents and care workers an issue; impetus to increase, enabling social connectedness
- Changing work practices - positive experiences and challenges
- Usage: Triune of residents, care workers, relative - moderator role, increased workload, configuration work

Case Study: Video connecting families & social robots

- Crisis situations can change imaginaries - respond to old and new problems
- Promoting/undermining values: social connectedness, autonomy
- Readiness: devices, digital competence (training/support), willingness of workers, institutional and political requirements (working conditions); interdependencies - ecosystem perspective
- Collaborative perspective - triune; recognition of workload, support structures, work roles

Case Study 3: Social Robot in Care Home



Carros, F., Schwaninger, I., Preussner, A., Randall, D., Wieching, R., Fitzpatrick, G., & Wulf, V. (2022). Care Workers Making Use of Robots: Results of a Three-Month Study on Human-Robot Interaction within a Care Home. ACM Conferences. Association for Computing Machinery. doi: 10.1145/3491102.3517435

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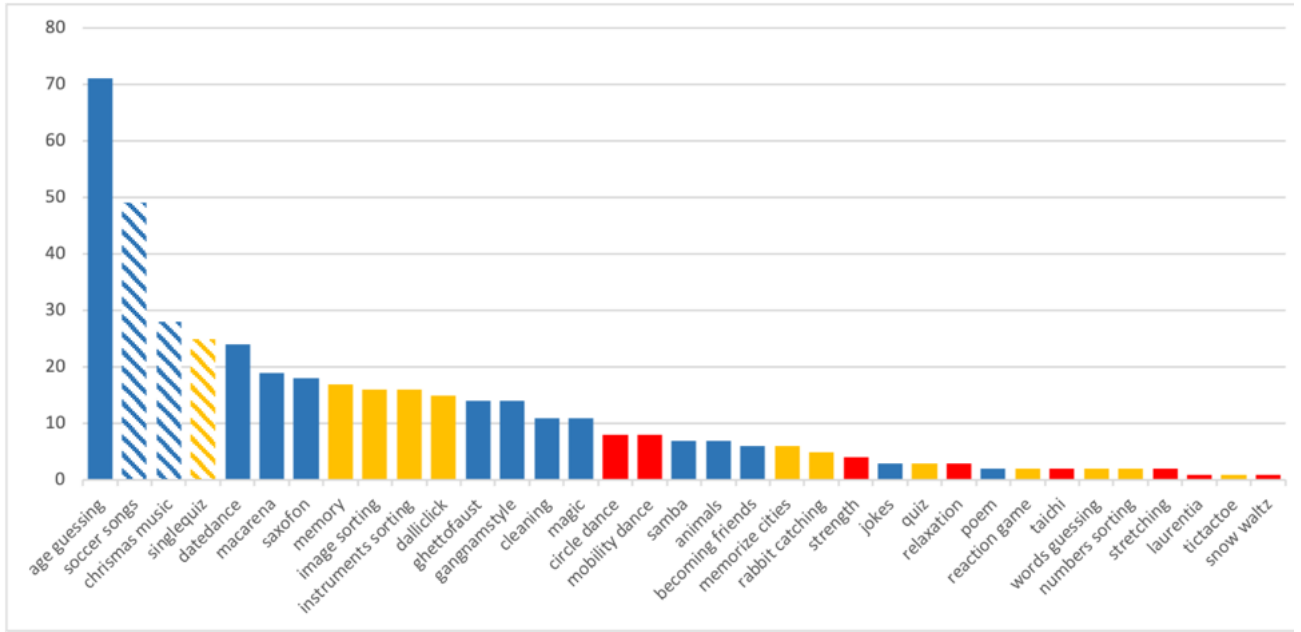
Case Study: Social Robot in Care Home

- Pepper robot in care home for 16 weeks - extension of 8 weeks upon request
- Previously developed system with features to support physical, cognitive, psycho-social activation
- Previous case study (diaries, interviews) to understand context of use, robot tailored to care home
- Semi-structured interviews with 10 social care workers, log-files of the robot, structured note-taking, workshops assessing adoption, use
- Tailoring of the application based on workshops and interviews

Activation type	Description	Example	Total
Physical Activation	Exercises and dances that encourage movement, relaxation and strength training.	Mobility dance	10
Cognitive Activation	Exercises and games that activate thinking and learning processes.	Memory	11
Psycho-social Activation	Applications that evoke meaningful memories or promote social interactions so that mood and well-being are enhanced.	Songs	17


Case Study: Social Robots in Care Home

- Integration into care procedures (next slide)
- Adaptation of robot applications by request - among most frequently used applications
- Robot as additional tool - Improve quality of care, no relief of burden
- Power users - certain care workers stepped up in pushing development, helping co-workers, taking responsibilities - measures could enhance role



Case Study: Social Robot in Care Home

Case Study: Older Adults and Everyday Technology in East Asia

Jung, M., Prochaska-Meyer, I., Schwaninger, I. (Forthcoming, 2025): Kakaotalk for social connectedness in South Korea: A qualitative field study with older adults and health IT experts in Seoul.

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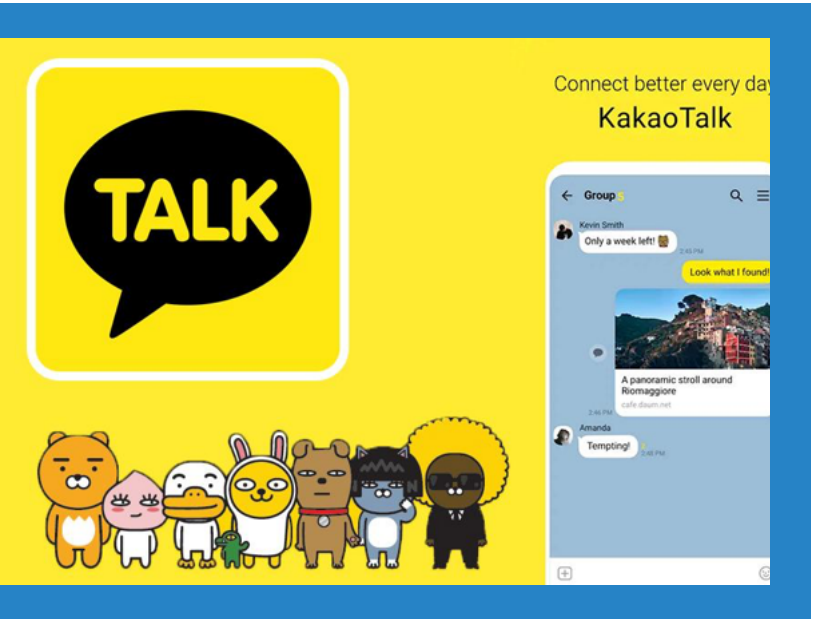
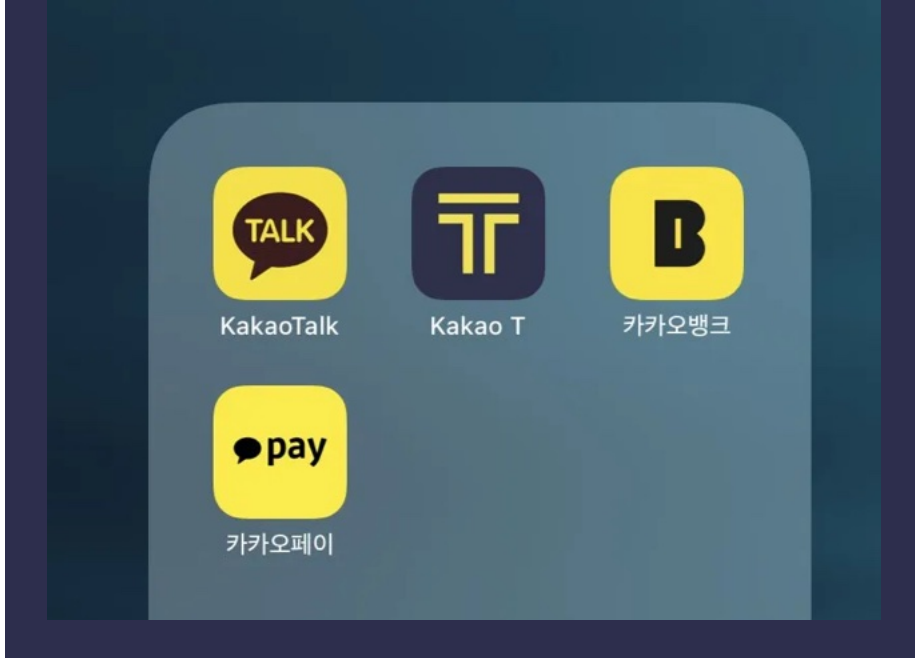
LCSB

	Japan 	Korea 	Taiwan 
Population aged 65+ (2020)	**28 %**	15 %	16 %
Population aged 65+ (2060)	38 %	40 %	40 %
Internet Penetration (2021)	94 %	96 %	92 %
Digital Competitiveness Ranking (2023)	32nd (of 64)	**6th**	9th
Future Readiness (DCR 2023)	32nd	**1st**	7th
Technology (DCR 2023)	32nd	12th	**3rd**
Knowledge (DCR 2023)	28th	10th	18th
Super-app	**LINE**	**KakaoTalk**	**LINE**





Super-app KakaoTalk in Korea

- ★ established 2010
- ★ used by 93 % smartphone users
- ★ also KakaoPay, Kakao T (mobility) etc.

Super-app LINE in Japan

- ★ established 2011
- ★ used by 94 % of people in Japan (2022)
- ★ also LINE Pay, LINE Taxi, LINE Health, LINE Doctor, etc.

Super-app LINE in Taiwan

- ★ launched 2014 in Taiwan
- ★ Used by 90 % of people in Taiwan (2019)
- ★ also LINE Pay, LINE Taxi, LINE Video, LINE Bank, LINE Travel, etc.

Case Study: Older Adults and Everyday Technology in East Asia

- Pilot Focus group: Vienna University, April 3, 2023

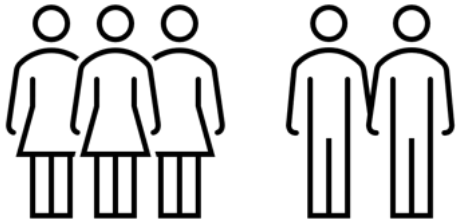
- **Field research: August 2023**

- Expert interviews with 13 experts
- Ethnographic street interviews oder: Informal Interviews with older adults

- Focus group interviews with 22 older adults
  - Kyung Hee University
  - KORDI: Senior Empl. Program: The Korea Human Resources Development Institute (한국인력개발원)
  - Welfare center Seocho

- 17 hours interview material (documentary)

Focus groups - summary & preliminary results



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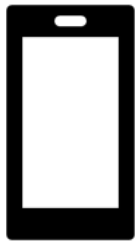
Age 65 - 75



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Focus Group Structure

- discussing the term digitalization (what it means to older adults)
- floor plan (discussing the devices they use at home and where exactly they use them)
- applications (what applications they use on a smartphone)
- 6 home aspects (for what purpose they use each of the applications on the devices)
- post-covid changes

The concept of “Home”

- Technologies (ICT) have changed fundamentally the way we perceive home as well as the physical quality of home itself

- “Home” can be regarded as an “abstract signifier of a wide set of associations and meanings” (Moore, 2000).
- Following basic terms have been frequently defined: **privacy; security; family; intimacy; comfort, and control** (Moore 2000:210).
- Smartphone as “Transportal Home”: Phones should be viewed more as a place within which we now live, rather than just a device we use. (ASSA/Anthropology of Smartphones and Smart Ageing)
- Methodology: make use of floor plan (Case Study - Trust Cards)

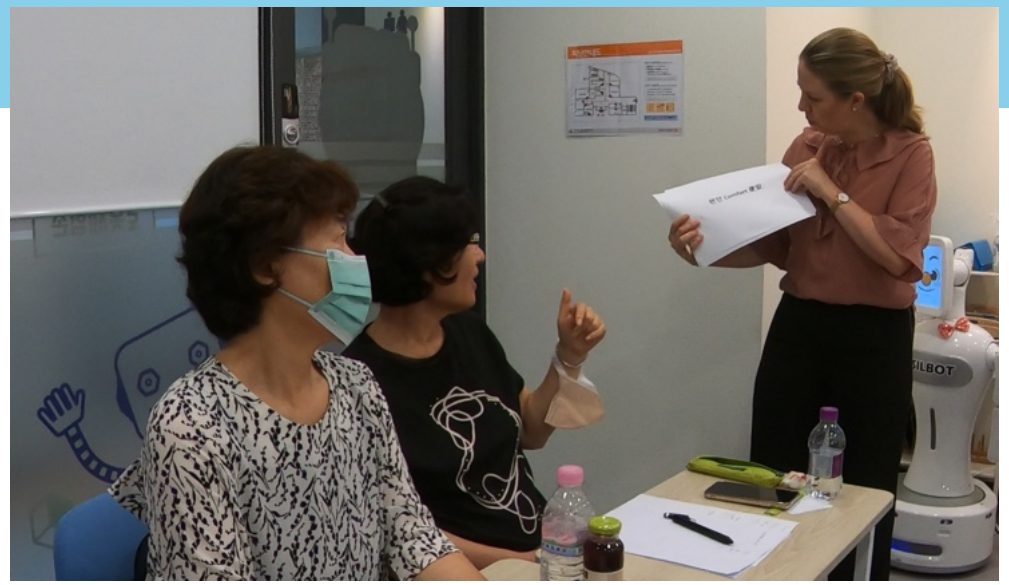
Task 1: Digitalization

- Association of **three words** that best reflect understanding of digital transformation
  - confusion about task and terminology
  - insecurity if they do it “right”
  - words often mentioned: **“convenience”, “easy to use”, “changing rapidly”, “foreign”, “unfamiliar” and “convenient”**

- **Devices are convenient, but** older adults are used to analogue, even if digital devices are faster and more advanced. Some (smart-home) functions exist, but used (connected) rarely

  - *“… it's too inconvenient to install it so that's why we're not using it.”*
  - *“… I don’t think there is a reason to connect anything else.”*
  - *“Digital devices are fast, [….]but I don’t use them. I’m familiar with analogue.”*

Task 2: 6 Home Aspects



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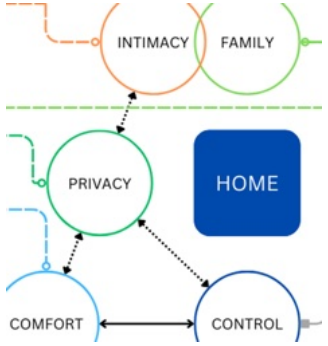
Family and Intimacy: Connecting, celebrating, supporting

Tech as a Good thing.

- General consensus that family and intimacy through the usage of social media and messaging services.
- *"Generally speaking, by using smartphones a lot, we become **closer."(**FG2, 277)*
- *"**Communication** through kakaotalk."(FG2, 190), "If we want to see each other, we mostly videocall through kakaotalk room."(FG2, 195)*
- *"Despite this distance, we stay **connected** through phone calls and frequent video chats, which helps us **feel intimacy.**" (Kordi)*
- *"(through KakaoTalk) we share and **celebrate good news**... and **support (each other) during difficulties** " (Kordi)*

Privacy and connectivity as a tradeoff

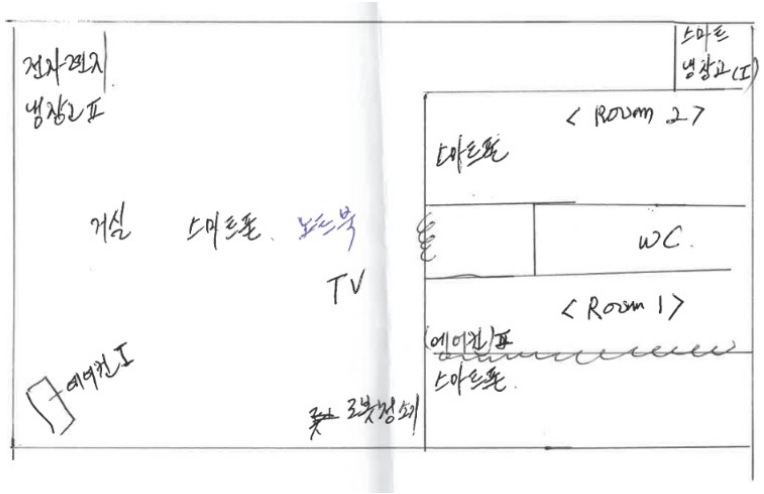
- *"Generally speaking, **by using smartphones a lot we become closer**... but it also **raises privacy issues** or other problems. I try to not be on **social media**... I don't like it when people I don't know keep talking to me, so there is a bit of a negative side to it all in that regard."* (SWC, 277-281)
- Calls from telemarketers: *"I have to make calls that I don't like, and I get all these **messages that invade my privacy**." (Kordi, 282)*
- *My daughter posts a **TikTok video**. It's our house, so why is it on the Internet? It can conflict with the sense of privacy and intimacy (Kordi, 299)*
- *"I get the feeling that technicians can see my photos whenever they want..." (Kordi, 194)*
- Lack of concern or discussion of privacy in some FGs: *"I don't have a lot of money, so even if I do internet banking, well they can't do much with it." (FG1, 525)*



Safety linked to health and wellness

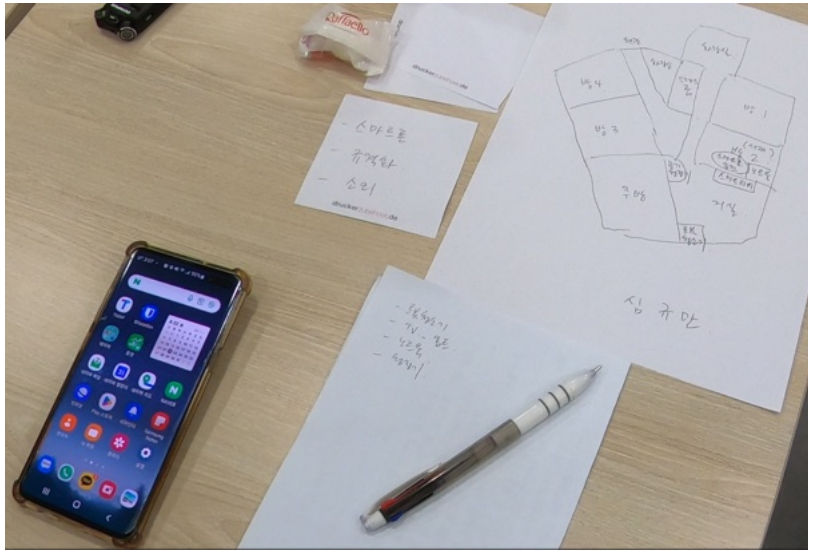
- The participants have associated safety with health, talking about apps and devices related to healthcare and fitness, but also alarm function.
  - *"**Medication dosage** is one of the examples."(FG2, 212)*
  - *"Yes, in my case, I wear a watch and it is taking my **blood pressure** and taking my pulse and things like that."(FG2, 213)*
  - *"I can control my smartwatch here, check my blood pressure and EKG, oh and I can also see how many **steps I walked**. I use a lot of the features, like pulse check." (FG1)*

Floor Plans



- All participants use TV
- Notebooks in extra room
- Lack of detail, difficult to read

Participants often highlighted the living room as a comfortable space, whereas they associate the bedroom with the concept of privacy.



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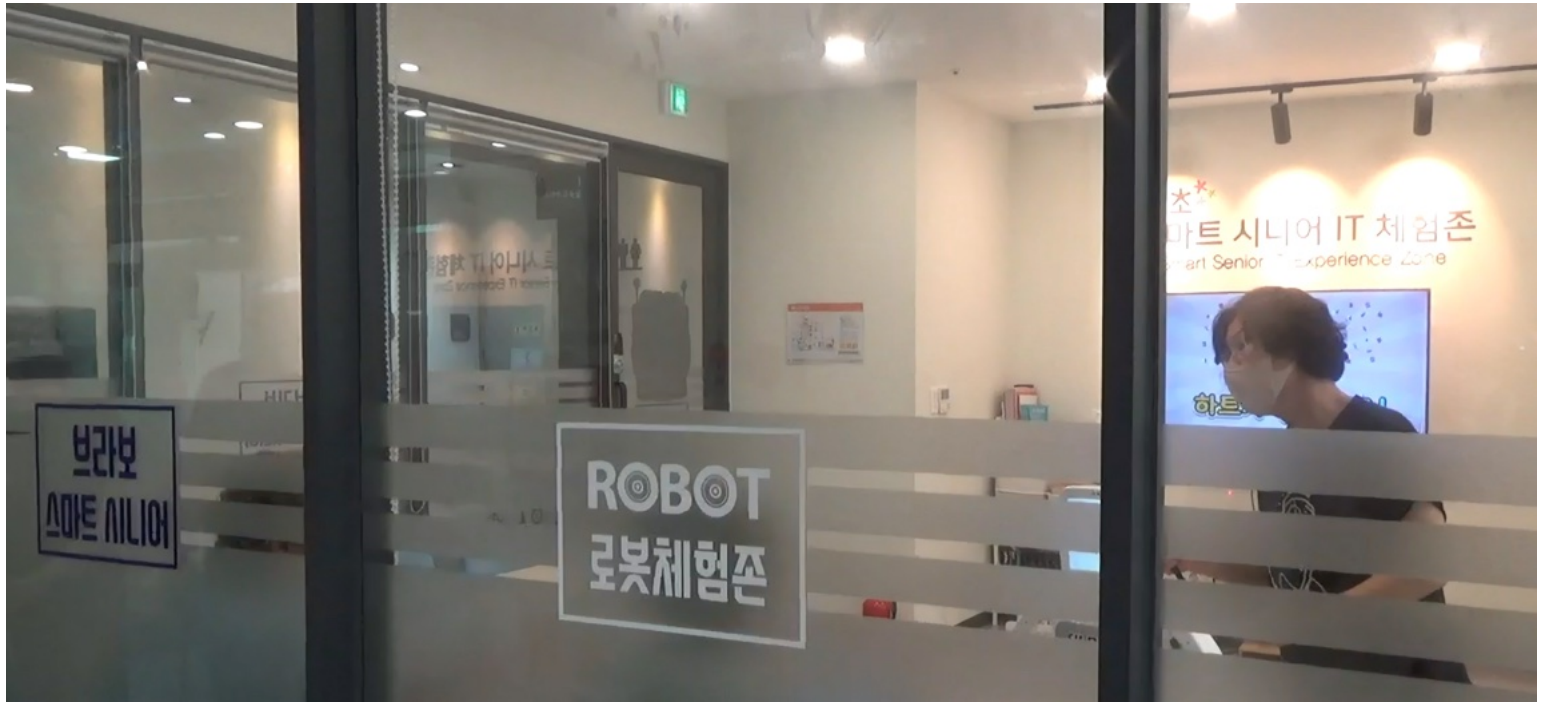
Smart Senior Experience Zone (Seochoo)



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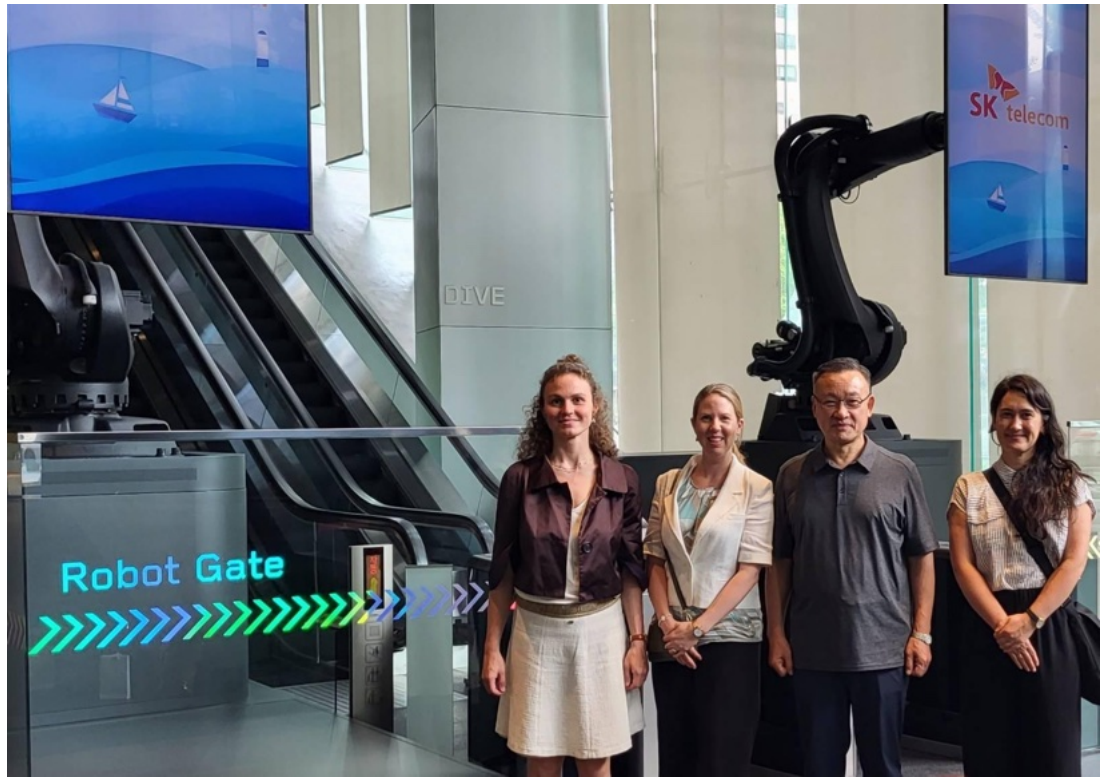
Expert and demographic street interviews



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Case Study: Older Adults and everyday Technology in South Korea - Learnings

- **Openness** for change, involvement in shaping digital ecosystem - ‘digital native’ seniors
- **Local** technology & content: Identification, wealth, trust
- High app usage. Superapp **KakaoTalk** (community) - integration of health apps into existing ecosystem
- Integration of IT (skills) into care procedures (low cost), rather than idea of replacement
- **Challenges**: misinformation (e.g., YouTube), accessibility (kiosks), gap urban-rural population. Technology often designed for **younger prototype users**
- new (digital) activities since **pandemic**: Zoom classes, stock market app, live sermons on YouTube, online shopping via Coupang, food delivery app, sending money as congratulatory gift online

Takeaways - Summary

- HCI in Healthcare complex field - including **digital health for medical contexts, assistive technology (robots), self-care technology**
- **Aging as adaptation** - important for HCI and engineers to **empower** users
- **Trust Cards**: method to ideate robots, focus on context, facilitate imagination, engaging older adults as designers
- **Video connecting families**: technology can promote or undermine technology depending on support structure and on how it is being used
- **Social robot in care home**: allow system adaptation to context, promote power users
- **Everyday technology in South Korea**: older adults as active users, promoting family and intimacy in tradeoff with privacy

Questions?

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