HUMAN-COMPUTER INTERACTION WITH AND FOR OLDER PEOPLE

An overview of a decade of research & current activities

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• **Background**
  • Human-Computer Interaction
  • My Research Philosophy
  • Ageing & Older People

• Overview of 12 years of research into HCI & older people

• Outline of (some) current and future research activities
Background

• **Human-Computer Interaction**
  - A multidisciplinary area concerned with the design, evaluation, and implementation of interactive products for human use, and with the study of major phenomena surrounding them (ACM Curricula for Human-Computer Interaction)

• **My Research Philosophy**
  - HCI *with* – People are the key measure of success / failure of ICTs
  - HCI *for* – Is my research useful for whom?
  - Implementation: ethnography / participant observation

• **Ageing & Older People**
  - An ageing population: fact, achievement / problem, opportunity
  - Who are older people? Who feels old (the Sixties)? To simplify: 60+
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Web Accessibility

• Motivation
  • *Web accessibility for people with disabilities* (Paciello, 2000)

• Web Content Accessibility Guidelines (WCAG)
  • WAI (Web Accessibility Initiative) of the W3C: strategies, guidelines and resources to help make the Web accessible to people with disabilities (and older people)
  • Guidelines are important: sharing knowledge, how-to, …
  • The WCAG focus on the content

• Research question
  • To what extent do the WCAG improve web accessibility for older people?
  • Addressed in my PFC (2004) & MPhil (2006), and PFC supervised (Camacho, 2006)
Web Accessibility - WCAG

Two websites - old-age pensioner associations in Barcelona

Selected findings – Navigation and Design of Links

- **Click here to** -> not included in the WCAG, but:
  - Clarifies where to click
  - Tells the older person what will happen after clicking

- **Keyboard-based navigation** -> fostered by the WCAG, but:
  - It is difficult to use (cognition)
  - Social inclusion

Web Accessibility

• **Disconnected lessons learned from my readings**
  - Older people experience numerous web accessibility barriers (surveys and experiments)
  - Web design: make decisions and prioritise
  - What people say they do versus what they really do

• **Making a connection: research question**
  - Which are the most and least relevant accessibility barriers in the everyday interactions of older people with the web, and why?

• **Approach**
  - 3-year (2005-2008) ethnographical study in Àgora (Barcelona)
  - Courses, workshops, monthly meetings…
  - 388 older people, mild-to-moderate age-related changes in functional abilities, mix of experience of ICT use
Web Accessibility Out of Labs

Pictures of my participants using and talking about the web

Selected findings - Relative relevance of some barriers

• **Social (digital) inclusion**: the mouse is a little beast. Yet, I want to use it, because my grandchildren use it too. Other devices make them feel different

• **Cognition is more important than vision**: Making errors – dependence, remembering; reading glasses

Web Accessibility – bringing life to labs

Distinguishing between required and optional fields in online forms

Experimental design – Selective Attention

- *, *, textual labels, binary
- One-way between-subjects ANOVA; (IV) way of marking fields, (DV) errors; N= 88; Yahoo!, Hotmail & Vueling
- Method of denoting required fields had a significant effect on the number of errors (p < 0.05)
- Done in conjunction with a PFC supervised (JM. Guijarro, UPF, 2009)

S. Sayago, J. Guijarro, J. Blat (2012). Selective attention in web forms: an exploratory case study with older people, Behaviour and Information Technology, 31 (2), 171-184
Web Accessibility – So What?

• **Technical and accessible accessibility**
  - Making a website WCAG complaint is not enough
  - There is a need for understanding better web accessibility for older people (WAI-AGE)

• **Re-examine taken-for-granted design decisions**
  - “Making things bigger” or using alternative devices is not *always* all that matters

• **Methodology**
  - Surveys, experiments & real-life / ethnography too
  - Ethnography feeds studies conducted under laboratory conditions – and vice versa
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Everyday Use of (Some) CMC tools

- **Context and motivation**
  - Over my ethnographical study, strong interest in CMC
  - Previous research on ageing: communication serves critical functions in ageing (e.g., reducing isolation)
  - In surveys, the e-mail is the ‘killer’ application among older people

- **Research question/s**
  - How do older people use e-mail (and other CMC tools) in their everyday lives?

- **Data**
  - Àgora (3-years)
  - Dundee User Centre (Scotland, 2010-2012)
Everyday Use – Selected Findings

Participants in Àgora and Dundee – Email, video chats, presentations

Rich use of CMC tools

- Is the Bcc field always needed?
- Recipients and content
- Individual activities are turned into social ones; privacy becomes intimacy
- Interactions beyond technophobia: joy
- They adapt to their interlocutors: video chat, writing skills & agendas

Everyday Use – Expected?

- **Within the context of HCI research and older people**
  - “The amount of effort needed to use a communication method is inversely related to its use” (Dickinson & Hill, 2007)
  - “Older people are less likely to be excited by or desirous of learning to use unfamiliar technology” (Newell, 2008)
  - “It is emphasized that there is a need to understand the deficits that come with age in order to design interfaces, systems, and services that are inclusive, usable, and easy for older people to learn and use” (Vines et al., 2015)

- **Considering widespread views (myths)**
  - “incapable of learning new, mainstream, technologies, and unable to use technology” (Durick et al, 2013)
Evolution of Everyday Use

• **Context and motivation**
  • Within the context of everyday use of CMC tools, interaction barriers / issues (connection with web accessibility barriers)
  • The next generation of older people (Hanson, 2009)

• **Research question/s**
  • How does the relative relevance of web accessibility barriers carry over to the everyday use of CMC tools?
  • Which of the problems older people encounter are due to a lack of ICT skills, and which are due to ageing?
Evolution of Everyday Use

• **Socialisation is time-persistent**
  - With little experience, gain confidence and overcome fears
  - With more ICT experience, avoid isolation

• **Cognition is always more important than vision**
  - Their memory is in their notes – regardless of experience of practice with ICT (go on holidays and forget)

• They do not hurry…ever, because **not making mistakes** is more important for them than doing things quickly
  - Errors increase cognitive load: Why? Where? How to solve it?

• **Social digital inclusion**, always
  - With little experience, ‘what my children and grandchildren use’.
  - With more ICT experience, ‘we are old, but we aren’t stupid’
Evolution of Everyday Use – So What?

A seminar on Windows 8

Some implications

• Interaction problems due to cognitive issues have not been solved by technology thus far

• Social, independent, competent and ordinary ICT users – only declines in functional abilities?

• Change of paradigm: from Factors to Social Actors (aligned with HCI waves, Bødker, 20006)
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Design of digital technologies

• Context and motivation
  • Assumption: Older people need technologies specifically designed for them
    • Cybrarian, an e-mail system (Dickinson et al., 2005)
    • ePortrait, an ambient displayed with SNS features (Cornejo et al., 2010)
    • HOBBIT, a socially assistive robot that helps seniors at home (FP7/2007-2013, http://hobbit.acin.tuwien.ac.at/)
    • Kisa: is the ultimate phone for seniors (http://www.kisaphone.com.au/)
    • ...
  • My research challenges this assumption, e.g., social inclusion

• Research question
  • Do older people need special technologies then?
Special technologies: on the one hand

• The **apparent advantages** of tailoring technologies to their special needs (e.g., enlarging text size) observed in laboratory conditions are not so evident in **prolonged use** of tools out of them

• Older people (at least, my participants) are old, but they do not want to be regarded as or feel **different**

• **Functions and options** which might be regarded as excessive, or inappropriate, are or can be **used over time**

• Reducing complexity might **deprive** older people of possibilities to improve and extend what they do
**Special technologies: on the other hand**

- It might not be such a bad idea; case study: YouTube*
- **Occasional use**, once or twice a fortnight
- **No interest in uploading videos**: privacy, perceived lack of usefulness
- YouTube comments are seldom read, made in person, and / or written in e-mails
- Ratings in conversations, **instead of clicks on ‘thumbs up’**: who rated this video?
- So, a version of YouTube which supports **better how they actually use** it might improve their interactions with it

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Special technologies: so…

• Do older people need technologies specifically designed for them? **Not always**
  • Older adults with major declines in functional abilities might need special technologies for them
  • Others, especially those who feel or are ‘fit for their age’, might just want to be or become ordinary ICT users

• Do older people need technologies specifically designed for them? **It depends**…
  • On their needs, aspirations, and current ICT use
  • Common sense and / our assumptions might be wrong
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Digital Games

• Context and motivation
  - Contradictions: Actual or potential players of digital games, while they are often considered nonavid users of digital technologies
  - Inconsistencies: benefits of playing games (improve cognitive and motor skills) seem to be at odds with their reasons for playing games (e.g., having fun, taking intellectual challenges)
  - Gaps: digital games designed for older people without involving them in the design

• Research question
  - What makes digital games sufficiently appealing, playable, and meaningful in the everyday lives of older people with different playing interests and levels of experience using ICTs?

Digital Games – WorthPlay project

- **WorthPlay** ([http://worthplay.upf.edu](http://worthplay.upf.edu), 2012-2013), a CERO project; funded by Fundación General CSIC and Obra Social “la caixa”

- **Conceptualization:**
  - 6-month ethnographical study of the play experiences of 170 active older people with different play interests (plus literature review)

- **Design / Implementation:**
  - Three Participatory Action Research (PAR) activities over a 2-month period

- **Evaluation:**
  - In three European countries (Barcelona, Madrid, Dundee)
  - 15 games created and played by 99 older people
Digital Games - Conceptualisation

Participants playing Rummikub

Selected findings

- Our participants are not interested in playing
- Meaningful (e.g., connection with grandchildren) and varied (connected with their life experiences) casual games
- Attention: concentration, not in tandem with other activities
Digital Games - Design

A geo-located book quiz

Selected findings

• Only one game? Diversity of interests
• From a game to an online platform of games – but how to design it?
• Tap into participants’ creativity and knowledge
Digital Games – Games & Platform

The platform (creating and playing)

Selected findings

- Mutual and between equals sharing and co-creation of knowledge
- Players, creators and co-creators of games
- Not forced to follow a specific path or achieve a particular objective
- There are no wrong answers; there is no time control

http://worthplay.upf.edu/game
Digital Games - Evaluation

Overview

• **Three settings**: In Àgora (Barcelona), Dundee User Centre (Dundee) and EspacioCaixa Madrid (Madrid)

• **Playful activities**: create and play games using the platform (and other digital technologies, e.g., tablets)
Digital Games – Evaluation (Results)

- **Most relevant benefit?** Learning and socialisation
- **Positive emotional reactions**
  - “You feel really good when you realise you still know some things”
- **Had fun and showed creativity –** they created games (!)
- **Older people as creators of games**
  - Most of the games designed for older adults regard them as players
- **Remarkably similar play experiences**
  - Despite heterogeneity
- **Productive play:** learning, feeling more digitally included
  - Play is often regarded as unproductive
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  • Emotional digital experiences from a Citizen (Cyber) Science lens
  • DIY (Do-It-Yourself)
ICT use and wellbeing

- **Wellbeing** (subjective perception that life as a whole is good) **is in the spotlight**, instigated (mostly) by financial and economic crisis
  - H2020, “Health, Demographic Changes and Wellbeing” challenge
  - UN – 20 March 2013 the first ever International Day of Happiness

- **Wellbeing is coming to prominence in HCI** (and in related areas)
  - *Positive Computing: Technology for Wellbeing and Human Potential* (Calvo, Peters, 2014)
  - Positive Psychology (Seligman, 2014), “Our message is to remind our field that psychology is not just the study of pathology, weakness, and damage; it is also the study of strength and virtue”

- **Why not before?** Computer use + international policies
ICT use and wellbeing: older people

• Overlooked, uncertain, decontextualized
  • Overlooked: Older Adults and Technology Use (Pew Research Center, 2014) – no mention to wellbeing
  • Uncertain: IT for active ageing: “minimal amount of research on testing on the efficacy of these technologies” (Parra et al., 2014); Mobile applications “are a powerful tool to improve the quality of life of the elderly, but they have not been sufficiently investigated” (Plaza, 2011)
  • Decontextualised: there is no evidence that computer use per se improves well-being among older people (Dickinson, Gregor, 2006); “training sessions, providing help and support (…) undoubtedly helped enhance this feeling of achievement (Bobillier, 2014)
ICT use and wellbeing: older people

Towards contextualising ICT use

• Different results if we see ICT use as a *situated activity* over an *extended period of time* from a *within perspective*

• “*Using computers here makes me feel alive*”

• It is using computers and the Internet (when, where, with whom, what for…) that has an impact, both positive and negative, on the well-being of older people
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Emotions and Citizen (Cyber) Science

- Emotions are a fundamental part of being human
  - Decision making, motivate action, add meaning to human experience

- The paradox of ageing
  - Emotional wellbeing improves across adulthood, in stark contrast to age-related declines in almost all functional abilities (Carstensen et al., 2011)

- Emotions are a key component of the current wave / paradigm of HCI research (Bødker, 2006; Harrison et al., 2011; Hassenzahl, 2010)
  - The turn to experience, beyond the instrumental (usability)

- What are the emotional interactive experiences of older people?
Emotions and Citizen (Cyber) Science

• “A rethink of the linkage between science and everyday life (...) the recognition that science does not simply fall from another planet (...) begin with the perspective of citizens (...) do science for people” (Irwin, 1995)

• Over the last 5-10 years, Citizen Science has become increasingly popular
  • Over 500 Citizen Science projects in http://scistarter.com
  • Observatorio de la Ciencia Ciudadana en España, http://ciencia-ciudadana.es/

• Older people and Citizen (Cyber) Science?
Emotions and Citizen (Cyber) Science

• A pilot project funded by the A-C-T network (Ageing-Communication-Technologies, http://actproject.ca/), intended to
  • examine cross-cultural, everyday emotional experiences of ICTs use by older people from a CCS lens
  • explore the participatory design of new types of online user interfaces (e.g., avatars, Embodied Conversation Agents) that make older people aware of and reflect on their emotional experiences

• A Science Shop@UVic_UST? Not only with / for older people…
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Do-It-YourSelf (DIY)

DIY – Making culture

• A flourishing DIY movement

• Perhaps, the beginning of a culture

• “Make: we are all makers”
  http://makezine.com/
  American magazine

Google Trends – DIY; 19-May-2016
Do-It-YourSelf (DIY)

- **An emerging site of HCI innovation** (Lindtner et al., 2014)
  - Design, digital tools, creativity...HCI (almost) everywhere

- **Within HCI & older people**
  - We (researchers / designers) design technologies for older people
  - **What technologies would older people create, if they were given the opportunity?**
  - An impossible question? Think about retired engineers or professionals turning 60 who are on the dole
Cutting across these activities…

• My willingness to put forward a change of paradigm in HCI research with older people

• HCI research with older people is not keeping pace with the evolution of paradigms (or waves) of HCI research

• A change of paradigm (in the sense indicated by Kuhn in *The Structure of Scientific Revolutions*) can – and should – take the field of HCI with older people forward

• [hciolderpopulation.wordpress.com/](http://hciolderpopulation.wordpress.com/)
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