Human-Computer Interaction with Older People: From Factors to Social Actors

Doctoral dissertation

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Overview of the presentation

- A key contribution of this PhD
- Specific contributions to the different areas explored
- Reflecting on the contributions and conclusion
- Discussing the conclusion
- Future work
The current HCI paradigm

- Older people are considered as a set of factors
  - Widespread approach: compensate for age-related changes in functional abilities
  - For example:
    - Guidelines: increase the text size
    - Training: minimize demands on working memory
    - HCI methods: limited mobility
Paradigm shift

- Proposed paradigm: interaction based on older people considered as social actors
- Actors: beyond reducing older people to certain characteristics
- Social: older people are not isolated (socialisation)
Evidence: areas and results

Selective attention, vision (making things bigger), memory (terminology, remembering steps)
- Changes in memory corrected with paper notes and practice
- Changes in vision corrected with glasses or getting closer to the computer screen

Relevance of interaction barriers, real-life e-mailing
Socialisation, independence, inclusion, the joys of ICT

Use and Context
- U1 Social Organization and Work
- U2 Application Areas
- U3 Human-Machine Fit and Adaptation

Computer
- C1 Input and Output Devices
- C2 Dialogue Techniques
- C3 Dialogue Centre
- C4 Computer Graphics

Human
- H1 Human Information Processing
- H2 Language, Communication, and Interaction
- H3 Ergonomics

Evaluation Techniques
- D3 Evaluation Techniques

Example Systems and Case Studies
- D4 Example Systems and Case Studies

Design Approaches
- D1 Design Approaches

Implementation Techniques and Tools
- D2 Implementation Techniques and Tools

Development Process

HCI methods, interaction measures, WCAG, training
Talk to me, do not make me write; errors are more important than time; some WCAG recommendations are of no use because increase exclusivity

Online forms, PDA, screen magnifiers, the mouse, the keyboard
- Bigger asterisks do not help to make less errors
- The mouse is difficult, but I want to use it because this is what my children use
- The biggest problem with PDAs is not the size

A key contribution (3/6)

Diverse methods

Quantitative

Qualitative

Mixed: case studies and usability tests
Interplay of methodologies

- **The crux of this thesis:** a classical ethnographical study
  - Growing awareness that practice is key to design better interactions (Blomberg et al 2003)
  - No ethnography in HCI with older people
- **Quantitative and mixed studies**
  - Paving the way for the ethnographical work
  - Understanding more specifically the ethnographical work
Compensating for is not the only thing that matters!

Relevance of interaction barriers, real-life e-mailing
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  - Contributions to use
  - Contributions to interaction
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Areas explored and methods

- **Areas:**
  - Relevance of accessibility barriers (vision, cognition, mobility and hearing) in everyday interactions with ICT
  - Real-life use of and interaction with e-mail systems

- **Method:**
  - 3-year ethnographical study in Àgora
  - Near 400 older people
  - Observations, informal and formal conversations
Socialisation

Individual activities are turned into social ones

- Motivation to use ICT is to socialise (physically & mediated by ICT)
- Example: e-mailing
- Different from us but similar to the shared use of mobile phones by teenagers
Inclusion
Technologies rejected if they increase exclusion

- The same technologies as those employed by their children and grandchildren
- Difficulties, but they do not want to feel or give the impression they are extraordinary
- Challenging developments done in labs by in industry and academy (e.g. Newell et al 2006: “larger fonts” in a portal for older users)
Independence

Inefficient use in favor of independence

Scenario: X (Man, 73) is discussing in a workshop about relevant aspects of his ordinary interactions with the web

“I enjoy using computers independently. When I started to use the web, I was so reliant on other people that I got the impression I was useless. I did not want to bother people, you know. Today, I am able to do my things on my own, such as watching my movies, sending emails and these things. I am very sure that the top priority for the rest of people in the session is to use the computer or go online without depending on anyone”

- Independent individuals in their adulthood and want to be so in their old age with ICT
- This is at odds with the traditional productive model
- However, it concurs with recent trends in HCI (e.g. Karat, 2003: “beyond task completion”)
“experienceful”

Interactive experiences beyond technophobia

- Examples: the feeling of accomplishment after having done something difficult; the thrill of receiving e-mails from people they love, feeling still active and useful
- This challenges current views: “older people are less likely to be excited by or desirous of learning to use unfamiliar technology” (Newell, 2008)
Publications related to contributions

- **Main publications**
  - ACM Conference paper: Best Paper Award in WA4 2009
  - Journal paper: Revision sent after first acceptance to the International Journal of Human-Computer Studies

- **Other publications**
  - CHI 2009 workshop on intergenerational communication
  - HCI International (real-life usability)
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Areas and methods

- **Areas:**
  - Online forms, assistive technologies (screen magnifiers), mobile web accessibility (PDA), WCAG, interaction measures and methods, accessibility factors, ICT training

- **Methods:**
  - Experimental design
  - Case studies and usability tests

- **Several settings:**
  - Àgora + pensioner associations and adult centers (Barcelona and towns nearby) – degree projects
HCI methods and measures
Social methods in real-life research

- Individual practices are unnatural due to socialisation (motivation)
- Thus, individual methods are unnatural and reduce motivation
- Example: questionnaires hinder socialisation (alone doing an exam!) whereas interviews increase it
HCI methods and measures
Interaction measures in real-life research

- Errors are more relevant than time due to the goal of being independent users and the non-productivity use of ICT
- Yet, much research takes place in artificial situations (labs or controlled environments) and is solely focused on functional abilities
  - “Attending the university” (Dickinson et al 2007)
  - What about we attending where they are?
Assistive technologies

Rejected if increase exclusivity

- Assistive technologies are helpful for the disabled (e.g. *Web accessibility for the disabled*, Paciello 2000)
- However, they are not so helpful for older people when they increase exclusivity
- Also, assistive technologies can make interactions more difficult
Guidelines (WCAG)

Some recommendations are not useful

- “These guidelines will also often make your Web content more usable to users in general” (WCAG 2.0)
- Keyboard-based navigation and inclusion
- “My grandchildren do not use the TAB or ALT plus sth so as to look for information”
- Also, the TAB strategy makes reading difficult
Factors
Cognition is more important than vision

- Diminishing cognitive load is more significant than making things bigger
- Failing to remember steps or making mistakes hinders independence
- Putting reading glasses on or getting closer to the screen in case the text size is not big enough so as to be read it easily
- Reviews of implications of ageing for design (e.g.; Hawthorn, 2000) have not addressed this relevance of barriers before
Factors
An example with online forms

- 48 participants
- Bigger asterisks do not help older people make less errors
- Binary classification does help them to fill in forms correctly
- With several forms (Vueling, Yahoo!) and with different older people
Factors
Examples in mobile web accessibility and training

- **Mobile web accessibility:** where am I? is more important than where is it?

- **ICT Training:** Yahoo! Flickr in a campus for older and adult education: as few steps as possible
Interaction variables

Life experience

- Talking instead of reading
- Individual activities make little sense in training
- Informal rather than formal training
- Errors more important than time
- Likert scales should be vertical
- ...
Interaction variables

Life experience

- Knowledge and experiences gained over their lifetime impact on the way they learn, interact with and make use of ICT
- This view of experience is much more complex than the traditional one, focused on technologies (how long have you been using...?)
- We are talking about education, culture, history...
- “A person who is 65 is a product of what he or she has been before” (cited in Settersen 2003, pp: 2)
Publications related to interactions

- **Main publications:**
  - ACM Conference papers: W4A 09, CHI-NZ 09
  - ACM Magazine: Crossroads
  - LNCS: ICCHP
  - Workshops: Cognition and the Web

- **Other related publications:**
  - HCI 06, ICEIS 07, WEBIST 07, W4A 08,
  - Convivio webzine
  - 9 (5 + 4 in June) degree projects supervised
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Reflecting on the contributions to use

- The work on use portrays older people as individuals who want to be independent, ordinary and social computer users.
- This conception of older people as users differs radically from the one considered in the current paradigm, based on factors.
Contributions and conclusion (2/3)

Reflecting on the contributions to interaction

- The work on interaction reveals that **compensating for (design) is not the only thing that matters**
- Older people’s goal of inclusivity, independence and socialisation have a strong impact on several areas of interaction
Conclusion

- Interaction **ought not to be understood in isolation** out of social contexts (as it has been)
- The current paradigm solves part of the problem. However, it is not enough
- Conclusion: From older people considered as factors to **interaction based on older people considered as social actors**
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Distinct and original contribution

- Age-related changes in functional abilities have a glaringly obvious impact on interaction
- However, **current research is putting older people out of their context**
  - “Attending the university” (Dickinson, 2007)
- Context = where, with whom and myself
- Supported by several evidence (use and interaction), in line with current trends in HCI research (Bødker, 2006) and studies of ageing (e.g. Handbook of the Psychology of Aging)
Diverse approaches

- Adopting different approaches
  - Ethnography, quantitative and mixed

- Specific contributions to methods
  - Vertical Likert scales, interviews rather than questionnaires, social methods

- The novel (and useful) use of ethnography
  - Current research in labs or controlled situations
Widening the field of knowledge

- ** Adopted and adapted concepts** from related areas
  - Life experience, from Life Course Research on Ageing
  - Ethnography from Anthropology
  - Inclusion from Inclusive Design
  - Independence from studies of the Psychology of Aging
- Advancing the understanding of HCI with older people
Main limitations

- Context (I)
  - The results might not be extrapolated to other social contexts
  - There is a trade-off between first-hand and detailed understanding of people’s activities and generalisation

- Context (II)
  - Àgora is education and this thesis is about real-life interactions. People do not simply go there to learn but to use ICT. The education lies in real-life use
... main limitations

- **Participants**
  - The results might not be extrapolated to other users
  - Older people are a very heterogeneous user group and more ethnography will be required
  - However, the results are representative of a growing number of run-of-the-mill older people who are using ICT in their lives
... main limitations

- Methodology
  - Put 20 ethnographers around a table and you will listen to 20 different stories
  - One should be aware of this, and I have carried out experimental ethnography + studies carried out in different settings

- No proof-of-concept
  - Other material (such as the photos) created can help. Understanding real-life interactions and use is a challenge by itself
... what can we build with this?

- From *vision, cognition, hearing and mobility to social actors*
  - Compensating for is required as interacting with ICT is a multisensorial activity
  - However, it should not be dissociated from the use that older individuals as people (not factors) make of ICT in their lives
  - This requires us to consider older people as social actors and ground interaction in real use in social contexts
... what can we build with this?

- **From interactions now to the history of interactions**
  - HCI takes a photo of interactions
    - Factors
    - Context
    - Social relationships
  - We suggest including exploring the life experience of older individuals in interactions
    - Before (and after) interactions
... what can we build with this?

- **From ethnography to experimental ethnography**
  - “I went there and this is what I saw”
  - Moments and models (Dourish, 2006)
  - Experiments to pave the way of ethnography (“before”) and to understand the impact of the insights (“after”)
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Future work

- **Life experience in interaction design**
  - How the past of older people impact on the way they interact with and use ICT?

- **Interactive experiences**
  - What are and how can we evaluate and support their interaction experiences?

- **The story of interactions towards better technologies: ethnography**
  - Both areas will require more ethnography
Thank you

- Josep, my supervisor
- My second family in Àgora
- The GTI, my friends and students
- Barcelona Media Research Centre
- The team of librarians at UPF and the secretariat team of the Department
About ethnography

- Classical ethnography because there was no ethnography in HCI with older people
- How do we do ethnography with older people? Learning from the experience:
  - Bridging the age gap
  - Slow down in order to go beyond the surface
  - Natural technologies (paper + pen)
Communicating ethnography

- The challenge was to do ethnography
- Now I can say that ethnography is mighty useful
- Another challenge is to communicate ethnography to designers
- This is not clear in current research. I have opted to use photos and let the users speak by themselves
- This is an issue for my post-doc
How did all begin?

- Old-age pensioner association in my town (while doing my MsC)
- Results I didn’t understand
- Comprehensive literature review
- There was a need for me to leave the room and see the real world
- Ethnography seemed to be the best approach
If I started again, I would

- Do more experimental ethnography (different methods, involving more people, building prototypes and testing them)
- Compare ethnographical methods and approaches
- Research on life experience and interactive experiences
- Follow some individuals with different profiles over time more carefully
- Try to be more ambitious in my publications (e.g. journals)
And the next generation of older people?

- I focused on a very relevant challenge: normal (young) older people interacting with ICT nowadays
  - They represent the bulk of the older population
- Motivated older people
- Other challenges are:
  - With no motivated older people? A key aspect would be to increase their motivation
  - Other users: adults who will enter older adulthood soon, disabled older people... The relevance of some results seem to be general (inclusion)
Work on evaluation in projects and older people?

- It would have been very difficult for me to do ethnography and understand the results without the experience gained in projects.
- Differences between older people and other people? This was not my objective – the first thing was to know older people as users. However, and even though this requires detailed comparisons, I would say that “the age gap” is a key difference.
- How do you bridge this gap? Forget about stereotypes; you do not know more than them; be very patient; say the same thing in several ways.
Guidelines are not useful enough, then what?

- A key issue is to understand interactions in social contexts.
- Patterns can be a better alternative to guidelines (capture some context and do not limit imagination)
- Personas can also be a very good way of promoting accessibility (WAI are using Personas, Joy Goodman in Inclusive Design)
- The problem with these representations is that they are not “computational” (think about a web evaluation tool)
Expand more on life experience

- How did you found life experience?
  - When I was young; I learned from my working experience that; when you are old you know that
  - Reminiscence is not always negative
- “The lifecourse perspective is perhaps the most widely cited theoretical framework in social gerontology today” (Bengston, 2005 – Cambridge Handbook of Age and Ageing)
- Methods in lifecourse research to unveil and understand “life experiences” (qualitative and quantitative, autobiographical notes, interviews, life reviews...)