Design Recommendations for TV User Interfaces for Older Adults: Findings from the eCAALYX Project

Francisco Nunes
Paula Alexandra Silva
Maureen Kerwin
Outline

- Context
- Problem
- Methodology
- Literature Review
- Design Recommendations for TV User Interfaces for Older Adults
- Discussion
- Conclusions
Context

Project eCAALYX

enhanced Complete Ambient Assisted Living Experiment

• Improve the quality of life of people with chronic conditions
  • Diabetes, COPD, heart failure, ...

• By providing better:
  • health monitoring
  • information about the disease
  • communication with health professionals
Design the Health Channel

TV user interface older adults will use to manage their health
Context

Project eCAALYX: Our role

• Health Channel enables users to
Project eCAALYX: Our role

- Health Channel enables users to
  - Videoconference with caretakers and emergency systems
Context

Project eCAALYX: Our role

- Health Channel enables users to
  - Videoconference with caretakers and emergency systems
  - Check their current condition of weight, glucose, blood pressure,…
Health Channel enables users to

- Videoconference with caretakers and emergency systems
- Check their current condition of weight, glucose, blood pressure,…
- Receive medication and measurement reminders
Context

Project eCAALYX: Our role

• **Health Channel enables users to**
  • Videoconference with caretakers and emergency systems
  • Check their current condition of weight, glucose, blood pressure,…
  • Receive medication and measurement reminders
  • Watch health videos
Project eCAALYX: Our role

- **Health Channel enables users to**
  - Videoconference with caretakers and emergency systems
  - Check their current condition of weight, glucose, blood pressure,…
  - Receive medication and measurement reminders
  - Watch health videos
  - Browse their agenda
Problem

- Older adults have specific characteristics
Problem

- Older adults have specific characteristics
  - Experience age-related changes
    - Vision
    - Hearing
    - Attention and Memory
Problem

- Older adults have specific characteristics
  - Experience age-related changes
  - Possess different experience with technology
Problem

- Older adults have specific characteristics
  - Experience age-related changes
  - Possess different experience with technology
  - Have different goals and needs
Problem

- Older adults have specific characteristics
- Unable to find guidelines for this context
  - TV applications for older adults
Problem

- Older adults have specific characteristics
- Unable to find guidelines for this context
  - TV applications for older adults
- What should be taken into account when designing for this context?
Advice on creating new technology

"When designing a product using a new technology, you have to consider and transfer HCI principles and guidelines, but you must also create prototypes and conduct usability tests to come up with the guidelines that are appropriate in your new context."

[1]
Methodology

Literature review

Low fidelity prototyping

Usability tests

Functional prototype usability tests
Methodology

- **Literature review**
  - Characteristics of older adults and age-related changes
  - Design guidelines for older adults

- **Iterative Low fidelity prototypes and usability tests**
  - TV paper prototype, soap remote
  - 8 usability test sessions
  - 5+ participants per test
  - Duration: 20 minutes
  - 16 participants (avg. age 79.4, [54-92])
Methodology

• **Functional prototype usability tests**
  • 10 participants
  • Avg. age 69.5 [61-78]
  • Duration: 45 minutes
  • 7 main tasks to assess the usability of the different functionalities
    • Agenda, watch health videos, medication reminder, …
Literature Review

- **Web Accessibility**
  - Web Accessibility Initiative (WAI) from 1997
  - Guidelines applicable beyond the Web context [2]
  - Solutions to empower people with disabilities may be useful for older users too [3].

- **Web Design for Older Adults**
  - WAI-AGE lists Web accessibility studies involving older adults [4]
  - Kurniawan and Zaphiris gathered 38 guidelines upon analysing 100+ studies [5]
  - Redish and Chisnell presented a set of heuristics related with navigation, information architecture, and visual design as a result from a literature review [6]
  - Large number of resources available
Literature Review

• iTV Design
  • TV is different from Web design: display characteristics, input devices, etc [7]
  • Chorianopoulos discussed the different attitudes: lean-forward vs lean-back [8]
  • Lu proposed a set of principles based on existing conventions [7]
  • Bernhaupt provided recommendations such as keeping text entry at a minimum by using automatic completion whenever possible [9]

• iTV Design for Older Adults
  • Gill and Perera provide tips to ensure accessibility of iTV [10]
  • Carmichael provides a thorough guide to the design of iTV services [11]
    • Outlines age-related changes and then presents 22 general guidelines.
Literature Review

- **TV-Based Application for Older Adults**
  - Related work is highly relevant, but not fully applicable to this context
  - iTV is concerned with enhancing the experience of watching a specific TV show
  - Previous work exists from Carmichael et al. for persons with dementia [12] but does not report on evaluation

- Therefore, it was necessary to identify the most significant guidelines for TV-based applications designed for older adults
Design Recommendations for TV-based Applications for Older Adults

- **Comprehensive system qualities**
  - Related to the overall behavior of the system

- **Visual presentation**
  - Regarding how information is conveyed to the user

- **Text characteristics**
  - Addressing the requirements for the presentation of text
Comprehensive System Qualities

- **Minimize number of steps to reach a given screen**
  - Information hierarchy restricted to three levels

- **Use consistency to facilitate recognition**
  - Consistency in visual components and behaviours, …
  - Particular relevant to persons with memory limitations and lack of prior knowledge

- **Make error recovery as painless as possible**
  - Explain errors in simple language
  - Without negative connotations
  - Explain how to proceed to resolve the situation
Visual Presentation

- Reduce the information presented so users can focus on a single concept at a time
  - Use animations sparingly and purposefully (e.g. fading arrows)

- Use scrolling with caution
  - Scrolling needs to be very clear

- Clearly indicate the current location
  - Titles indicate actions

- Show the current selection clearly
Visual Presentation

- Use meaningful icons and labels
  - More important for users who have trouble reading

- Concentrate information at the center of the screen
  - Initial tests indicated older users missed information near the edges
  - Participants only recalled the center of the screen (4 drew the title, and only 1 drew an element in the edge)

- Use a high contrast color scheme
Text Characteristics

- **Use large, sans serif, left-aligned text**
  - Sans serif fonts are easier to read on the screen
  - Text should be as large as is reasonable
  - Tests with 20 users showed at least 40pt is required

- **Use simple language**

- **Give users time to read**
  - Older adults read more slowly (memory, modest academic education)
  - Popups that disappear after a certain number of seconds should be replaced with ‘OK’ selection
Discussion

• Solid recommendations based on
  • Thorough literature review
  • Two phases of user evaluation (one of them iterative)

• Further validation is required, may not apply to all seniors
  • Hard to access this particular audience, so the number of users to be significant
  • This work contributes a step forward in the context of designing UIs for TV applications for older adults

• Participants were able to conclude tasks successfully
  • This contributes to the validation of design recommendations
  • Remote might have negatively interfered with the results of the evaluation
Conclusions and Future Work

• **Conclusions**
  
  - 13 recommendations to guide the design of TV applications for older adults
  - Build upon the review of relevant literature, the conduction of user research and evaluation during the eCAALYX project
  - References to related guidelines
  - Examples of how each concept materialized in the Health Channel

• **Future work**
  
  - Expand this work to include guidelines that cover other input modalities such as audio or gesture
References (I/II)


The complete results will be presented at ACM ASSETS 2012
Thanks!

francisco.nunes@fraunhofer.pt
palexagmail.com
mkkerwin@gmail.com