Technology intervention in health services delivery

ICT support structure for aging-in-place

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BACKGROUND

IE background

• Focus area: human factors
• MS thesis: Usability evaluation of mobile interfaces using video-based behavior monitoring and eye gaze analysis

Research experience

• Interaction & interface design
• Kansei engineering
• Service environment
• Workplace ergonomics
• User observation
• Consumer studies

Research interest

User-centered design
  User interaction
  Usability

User-centered development
  User involvement
  User experience

User-centered systems
  User as a component
  UX in different contexts
AGELAB

100 years of quality living

- Developing new ideas to improve the quality of life of older adults
- Creative use of technology – combined with an understanding of human behavior – will lead to innovations in living across the lifespan
- Research themes: transportation & community, housing & home services, health & wellness, business & policy innovation, and longevity & planning

AGING-IN-PLACE

A service model for older adults

- Living longer in one’s own home confidently and comfortably
- Not having to move for necessary support services in response to changing needs

Meeting their needs

- Remaining independent in their own homes for as long as possible and avoid hospital-based care (AARP 1996; Wib 1996; Russell 1999; Demiris et al. 2004; Williams et al. 2005; Wang et al. 2010)
- Only willing to move into a nursed care facility if no other choices (Steele et al. 2009)
- Forcing a frail older person to move from one setting to another results in mental and physical deterioration (Manion & Rants 1995; Johnson 1999)

Growing popularity & implications

- Society, industry and government are looking for solutions (Rodriguez et al. 2009)
- Design for specific needs and characteristics
- Certified Aging-in-Place Specialists (CAPS)
- Global issue: cultural considerations
ICT FOR OLDER ADULTS

Technology solutions for aging-in-place

- ICT as the center of strategies for active, healthy aging (European Information Society 2010)
- Potential of ICT in increasing opportunities of health and social care delivery (European Commission 2007)
- Incorporation for communication and engagement, health and wellness, and home safety and security

Considerations for technology

- ICT has been successfully adopted mainly within integrated health systems, but not in OA care (Wang et al. 2010)
- OA are willing to try out new technologies that are readily available (Demiris et al. 2004)
- OA are different from other users in terms of cognitive and physical abilities, health status, technology literacy and familiarity, and motivation to use technology (Kraus et al. 1996; Selwyn 2004; Czaja et al. 2006)
- Differences in needs, requirements and expectations have to be fully considered for design, development and implementation

SYSTEMS APPROACH

Current state in research

- Majority of studies on specific technologies
- Extensive research done on issues of usability
- Many are exploratory and qualitative, based on user interview

Need for systems approach

- Aging of population is putting more pressure on the public and private healthcare systems (Steele et al. 2009)
- Without considering broader micro and macro aspects of OA care, it is not possible to understand the complexity involved (Wash & Callan 2010)
- It is important to consider the wider context in which OA live, such as policy and resources (Wang et al. 2010)
SYSTEM OVERVIEW

Older adults
Family and friends
Formal caregivers
Commercial products & services
Government services
Public policy
Social definition of aging

SYSTEM OVERVIEW

Technology
Social connections
Everyday tasks
Monitoring health
Policy & resources
**E-HOME FOR OLDER ADULTS**

### ICT solutions in home environment

- OA have positive attitudes toward technology reducing their own effort for performing health-related tasks at home (Mitzner et al. 2010)
- The intersection of OA’s desire to remain independent at home and the aim health care control (Demiris et al. 2004)
- ICT can help OA to maintain emotional and social ties (Rodriguez et al. 2009)

### Project overview

- Integration of technologies for development of assistive home health care solution
- Consideration of social aspects that are required by users
- Utilization of developed software
  - RAILS for data aggregation and access
  - Meeting Plaza for social connection

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**E-HOME FOR OLDER ADULTS**

### System overview

- Medication compliance
- Nutrition
- Social connection

### Field trial

- Most OA are not accustomed to modern technology (Steele et al. 2009)
- For exploratory study of system usage & adoption
- Gaining insight, not necessarily data
CURRENT TOPIC

Research question
• What are the factors that determine OA's acceptance and adoption of technology?
• What are the characteristics required in developing technology for OA?

Background
• Findings contradict stereotypes in OA's use of technology
• OA's relationship with technology is more complex than commonly understood (Mitzner et al. 2010)
• The need for an assessment of the needs and expectations of OA (Demiris et al. 2004)
• Importance of understanding OA's technology usage and perception
  – The difficulties in adopting technology need to be studied for successful use of technology in increasing the quality of life (Czaja et al. 2006)
  – Essential for maximizing the potential that technology has to offer for facilitating independence in everyday life (Mitzner et al. 2010)
• A large number of variables impact technology acceptance including characteristics of the technology and its user (Caine et al. 2006)

“Ten perceptions on misperceptions of OA’s technology adoption & use”

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Propositions (conditions for adoption)</th>
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<tbody>
<tr>
<td>Value</td>
<td>They can perceive the useful value</td>
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<tr>
<td>Confidence</td>
<td>They feel confident about using the device or the system</td>
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<td>Economics</td>
<td>It doesn’t cost too much</td>
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<td>User-friendliness</td>
<td>It’s designed and made for them to easily learn and use</td>
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<td>Independence</td>
<td>Using it does not stigmatize them or make it visible that they’re old and dependent</td>
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<td>Social connectivity</td>
<td>Their peers or social circle support its use</td>
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<tr>
<td>Experience</td>
<td>Their prior experience has involved improvements from use of technology</td>
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<tr>
<td>Technical support</td>
<td>They can receive quality support in learning, maintenance, repair, etc.</td>
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<tr>
<td>Emotion</td>
<td>They can receive emotional benefits by using it</td>
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<tr>
<td>Accessibility</td>
<td>It is easily accessible in that they have the knowledge of its existence and availability in the marketplace</td>
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RESEARCH PLAN

Current topic

- Developing a framework
- Dimensions: individual, social, and technological

Future research

- Define & form research questions
  - Address multiple aspects of the system
  - Consider practical and theoretical contributions
- Find applicable methodologies
  - Past and current research are mostly qualitative and exploratory: surveys and interviews
  - Possibility of conducting experiments
  - User observation? Pattern finding? Data mining?