Acceptance of ICT monitoring solutions for health reasons in an ageing society

Widening the focus from living space to urban quarter

Simon Himmel, Martina Ziefle, Katrin Arning
Agenda

• Introduction and previous research
• Research focus and methodology
• Results
• Discussion and outlook
Introduction
Demographic change

Challenges in western societies for human centered living conditions at home and in urban environments

Decrease in birth rates + Numeral increase in older and care-needig people

- Increase in age related sudden breakdowns and
- More older people being alone (private & public spaces)

(Statistisches Bundesamt, 2013)

Possible (technical) solutions

Plenty of advanced eHealth technologies

Wearable devices
© Life Call W.D'Avia
© Life Assist USA

ICT solutions
© 2012 NBN Co Limited
© Robert Nystrom

Monitoring

Ambient Assisted Living
European Network of Living Labs

Simon Himmel, Martina Ziefle, Katrin Arning
However ...

Personal constraints
• Privacy & intimacy concerns, data security,
• Dependency on technologies,
• Usability problems,
• End of life control

Technical state of the art
• eHealth devices restricted and often isolated,
• Ambient assisted living: advanced at home...
  But not in urban quarter
Acceptance

In addition to discussing technical solutions we need to address acceptance issues, especially in a diverse user group.
Previous research

Focus on private spaces
Private spaces

• Who would accept ICT technologies for health reasons?
• Which technologies would be accepted, which denied?
• Where could these technologies be installed, which rooms are acceptable, which are off-limits area?
• What else are influencing factors or conditions to accept surveillance technologies at home?
Focus Groups
Questionnaire study

- Quantitative validation of focus group results

→ Room-Technology-Acceptance Matrix (3x3 example):

<table>
<thead>
<tr>
<th>integrated technologies</th>
<th>rooms</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>livingroom</td>
<td>bathroom</td>
<td>bedroom</td>
</tr>
<tr>
<td>microphone</td>
<td>7.65</td>
<td>7.40</td>
<td>7.40</td>
</tr>
<tr>
<td>camera</td>
<td>7.65</td>
<td>7.10</td>
<td>7.10</td>
</tr>
<tr>
<td>positioning</td>
<td>7.65</td>
<td>7.65</td>
<td>7.65</td>
</tr>
</tbody>
</table>
Key results (focus: private spaces)

- Acceptance of monitoring devices for health reasons is driven by:
  - **Monitoring technology:**
    1. Camera refused,
    2. Microphone less refused
    3. Positioning system most likely accepted + room independent
  - **Private spaces:** Acceptance decreases from distant (home office, living room, kitchen) to intimate (bedroom, bathroom) spaces.
- User diversity (age, gender, interest in technology, health status) did not influence acceptance
- Frequent statement: „I would only accept these technologies if I was ill“
Are these findings reproducible?

and

What happens when widening the focus:

From private to public spaces?
Research Focus
Research Focus

Integrated Surveillance Technologies

from private Domestic Spaces ...

Camera

Microphone

Positioning System
Research Focus

Integrated Surveillance Technologies

from private Domestic Spaces ... 

Camera

Microphone

Positioning System

... to public Urban Spaces

© KCAP/ASTOC and Studio Urban Catalyst
Research question

Technology acceptance research focussing (interacting) factors:

„Who“ (user diversity) would accept
„which“ (technologies),
„where“ (private & public spaces) and
„when“ (scenario: for medical reasons in an aging society) ?
Methodology
Focus groups

• Which technologies should be surveyed?

• Which urban spaces should be considered and why?

→ Which additional dimensions could influence acceptance? – not all public spaces are experienced equally
Classifying spaces (2d)
Classifying spaces (3d)
Participants

• n=127
• aged: 19-74 (M=37.8, SD=17.9, f: 41%, m: 59%)
• split into 3 age groups:
  • young: 19-28 (40%, M=22.8, SD=2.6, f: 49%, m: 51%)
  • middle-aged: 29-59 (30%, M=38.2, SD=9.4, f: 26%, m: 74%)
  • old: 60-74 (30%, M=65.9, SD=4.3, f: 44%, m: 56%)
• high educational level
  (40% university entrance diploma, 47% university degree)
• 70% classified as healthy
Results
Overall acceptance of technologies

- Microphone: negative (mean: -2.1)
- Camera: negative (mean: -2.8)
- Position: negative (mean: -1.1)

Overall acceptance:
- Positive
- Negative
Age × Surveillance Technology

microphone

-3.0  3.0
-2.2  2.2
-1.4  1.4
-0.3  0.3
-0.1  0.1

-3.4  3.4
-6.5  6.5
-0.1  0.1

-2.1  2.1
-0.3  0.3
-1.7  1.7

never  no  rather no  rather yes  yes  always

young  middle-aged  old

Simon Himmel, Martina Ziefle, Katrin Arning
Gender x surveillance technology

-30 -18 -6 6 18 30
never no rather no rather yes yes always

microphone

-2,1 2,6
-2,7 4,1
-2,1 -0,3

camera

position

male female

Simon Himmel, Martina Ziefle, Katrin Arning
Health status $\times$ surveillance technology

- **Microphone**
  - Healthy: -3.9
  - Ill: -1.6

- **Camera**
  - Healthy: -7.4
  - Ill: -0.7

- **Position**
  - Healthy: -6.3
  - Ill: 0.7

Simon Himmel, Martina Ziefle, Katrin Arning
Discussion
Discussion

- Rejection of all monitoring technologies, camera least accepted
- Former results for private spaces could be reproduced
- Technology adaption: where monitoring is well established (train station, museum) it is most accepted
  (keep in mind: safety reasons vs. medical security)
- User diversity:
  - Age: no significant influence, some tendencies
  - Gender: no influence,
  - health condition: impact for public spaces
    (significant less acceptance within ill people)
- Classification of spaces:
  public + distant + outdoor space: by trend accepted
- Enormous variance \(\rightarrow\) separating factors not (yet) found!
Outlook – Further Research

→ Sensitive understanding of illness as influencing factor for technology acceptance

→ Reasons for the inter-individual standard deviations (risk perceptions, anxiety, something else?)

→ Deeper insights into individual attitudes, wishes, needs

→ Where are the trade-offs for acceptance?

→ Cultural influences on acceptance in our research context?

→ Perfect but extremely challenging: Real-Life testing in urban quarters (urban living lab)
Thank You!

Outlook – Further Research

→ Sensitive understanding of illness as influencing factor for technology acceptance
→ Reasons for the inter-individual standard deviations (risk perceptions, anxiety, something else?)
→ Deeper insights into individual attitudes, wishes, needs
→ Where are the trade-offs for acceptance?
→ Researching cultural influence on acceptance in our context!
→ Perfect but extremely challenging: Real-Life testing in urban quarters (urban living lab)

Simon Himmel
himmel@comm.rwth-aachen.de