mobileWAY – A system to reduce the feeling of temporary lonesomeness of persons with dementia and to foster inter-caregiver collaboration
Agenda

1. Project information
2. Motivation of the research
3. Qualitative user research
4. End user evaluation results
   4.1 Preliminary comprehensibility and usability evaluation
   4.2 Sequential comprehensibility and usability evaluation
5. Conclusions
6. Future work
7. mobileWAY Demo
mobileWAY is my Master thesis work conducted at the Fraunhofer Research Center for Assistive Information and Communication Solutions (AICOS) in Portugal.

- Duration of project: **9 months**, accomplished **2011-2012**. *(Initial research, conceptual and visual design, preliminary evaluation)*

- Published preliminary results at INTERACT 2011 (WS)


**Extension in 2012**

- Renato Oliveira’s Master thesis
- **User Interface iteration, sequential evaluation and implementation**
2. Motivation of the research

“…36 million people living with dementia worldwide in 2010, increasing to 66 million by 2030 and 115 million by 2050.”


“….the global cost of dementia in 2010 at $604 Billion.”


“If it were a company, it would be the world’s largest by annual revenue exceeding Wal-Mart (US$414 billion) and Exxon Mobil (US$311 billion).”

3. Qualitative user research

Exploratory interviews
• Semi-structured interviews with 9 informal caregivers and 2 professional caretakers
• 2,5 hours of audio record and 40+ pages of audio transcription

Selected key troubles identified in interviews
PwD: Concealment (stigmatization angst), Problematic technology adoption, Inability to cope with environmental disruptions
Caregivers: Arrangement of life with caregiving, Fear of leaving the PwD on his own, Stress due to caregiver burden, rushing around

Idea
Passive, stationary and informative interface for the PwD in cases of temporary lonesomeness
Interactive, mobile interface for the caregivers to display information about their whereabouts and organize themselves
4. Evaluation with end users

Preliminary Evaluation

- 3 tasks with 4 caregivers
  - **Usability** of the tablet interface (*Think Aloud, Wizard-of-Oz*)
  - **Usefulness** of the application for both user groups (post-test questionnaire)

- 6 tasks with 2 PwD
  - **Comprehensibility** of the **TV** interface (*open questioning*)

Sequential Evaluation

- 9 tasks with 10 caregivers
- 2 tasks with 5 PwD
- **Similar Methodology**
  - (*Added functionalities and slight redesign*)
4.1 Preliminary evaluation (4 informal caregivers)

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Steps needed</th>
<th>Steps taken across participants (n=4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mode</td>
</tr>
<tr>
<td>1 – Add Caregiver</td>
<td>8</td>
<td>8.8</td>
</tr>
<tr>
<td>2 – Change activity picture</td>
<td>8</td>
<td>9.3</td>
</tr>
<tr>
<td>3 – Display information on TV</td>
<td>12</td>
<td>13.3</td>
</tr>
</tbody>
</table>

Figure
Paper Mockup used for the evaluations and IPad sketch.
## 4.1 Preliminary evaluation (2 PwD participants)

<table>
<thead>
<tr>
<th>Tasks</th>
<th>PwD</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1 - Comprehensibility test of a hourglass icon</td>
<td>FU</td>
<td>NU</td>
</tr>
<tr>
<td>2 - Comprehensibility test of a clock icon</td>
<td>FU</td>
<td>NU</td>
</tr>
<tr>
<td>3 – Select a preference</td>
<td>PU</td>
<td>NU</td>
</tr>
<tr>
<td>4 – Comprehensibility of caregiver absence scenario 1</td>
<td>FU</td>
<td>NU</td>
</tr>
<tr>
<td>5 – Comprehensibility of Caregiver absence scenario 2</td>
<td>FU</td>
<td>PU</td>
</tr>
<tr>
<td>6 – Comprehensibility of Caregiver absence scenario 3</td>
<td>FU</td>
<td>PU</td>
</tr>
</tbody>
</table>

**Legend**

- **FU** = Full understanding
- **PU** = Partial understanding
- **NU** = No understanding

**Figure**

Setup: Task 5 of PwD 2
### 4.2 Sequential evaluation (5 PwD, 10 caregivers)

<table>
<thead>
<tr>
<th>Tasks</th>
<th>PwD</th>
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<tbody>
<tr>
<td></td>
<td>3</td>
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<td></td>
<td>7</td>
</tr>
<tr>
<td>1 - Comprehensibility of caregiver absence scenario</td>
<td>FU</td>
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<td></td>
<td>FU</td>
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<td></td>
<td>FU</td>
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<td></td>
<td>PU</td>
</tr>
<tr>
<td>2 - Comprehensibility of the photo slide show</td>
<td>FU</td>
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<td>FU</td>
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<td></td>
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**Bottom Line:**

Similar results in comparison to the preliminary evaluations
5. Conclusions

- Preliminary evaluation
  - Comprehensibility tests: Partial success, recall of memoirs (PwD 2)
  - Usability test results: Tablet interface easy to use
  - Questionnaire results: Improvement of life quality of both PwD’s and caregivers

- Sequential evaluation
  - Similar results

- Conduction of the PwD evaluations at their home was very beneficial

- Involvement of the informal caregivers helped to facilitate the PwD evaluations

- Usage of real photos of the PwD’s individual environment seems promising

- mobileWAY uses off-the-shelf technology and is therefore affordable as well as highly customizable to one’s individual needs
6. Future Work

• Addition of auditory and haptic modalities in both, the PwD interface and caregiver interface

• Smartphone redesign of the app for the caregiver side

• Implementation of the shared To-Do list, calendar, forum and media functionalities

• Explore how to reasonably integrate mobileWAY in:
  • TV broadcasts
  • Other individualized systems such as personalized health information systems

• Further investigation how to exploit PwD’s significant memories with audio-visual media for improved reminders or to foster well-being.
7. mobileWAY Prototype demo
Thank you... questions?

**MobileWAY:** Information for patients and integration for caregivers

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**TV interface**

João is at Church and comes back in 30 minutes

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**Tablet interface**

João is at Church and will be back in 30 minutes