Building Engaging Web and Mobile Solutions for the Diverse End-User Groups of Care Cooperatives:

Hands-on Workshop on the iCareCoops System Design Process

Olma Halle 2.1, St. Jakobstrasse, 9000 St.Gallen
27 September 2016 | 09:00 – 10:30

Workshop 4 | Theme 3: Satisfy the expectations of all AAL stakeholders
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Workshop objective:

Participants have a better understanding of end-user involvement throughout the system engineering process in the diverse AAL landscape and got to know methods and tools they can employ in their projects.
1. Introduction to the iCareCoops approach 9:00 – 9:30

2. Design walkthrough in groups 9:30 – 10:00

3. Discussion of lessons learned 10:00 – 10:30
1. Introduction to the iCareCoops approach
9:00 – 9:30

2. Design walkthrough in groups
9:30 – 10:00

3. Discussion of lessons learned
10:00 – 10:30
Demographic change poses a threat to elderly care
Web 2.0, mobile technologies led to rise of the sharing economy.
AAL solutions enhance quality of life of older adults through ICT
Increase efficiency and quality of elderly care through the cooperative model and ICT solutions
What is a cooperative?

A business owned and run by its members to satisfy their needs

Concern for the community

Member economic participation

Democratic member control

… cooperatives are another way of doing business!
What makes us different

Control

cooperative

Democratic control
1 member = 1 vote

‘traditional’ business
Shareholders control according to their investment share

Nonprofit organisation
May be controlled by members who elect a board or, in non-membership organizations, the board may elect its own successors
Board membership

**cooperative**

Members *elected* by members

**‘traditional’ business**

Combination of independent directors, management and other directors with financial or business ties to the organisation

**Nonprofit organisation**

People who usually do not receive the services, usually chosen for philanthropic or political reasons
What makes us different

**Objective**

- **cooperative**
  - Satisfy needs, maximize customer & member service and satisfaction

- **‘traditional’ business**
  - Maximize shareholder returns

- **Nonprofit organisation**
  - Serve the public interest
What makes us different

Dividends

cooperative

- Reinvested in the business and/or returned to members

‘traditional’ business

- Returned to shareholders based on ownership share

Nonprofit organisation

- Entirely reinvested in the public benefit purpose and their own operations
Care cooperatives‘ added value

Sustainable multi-stakeholder partnerships

Permeability between needs and offer, innovation

Involvement of end-users

Profits reinvested locally

... care cooperatives generate social benefits for their communities!
Addressing the diverse target groups
M. Clarkson (1995) identifies

a) primary stakeholders

b) secondary stakeholders

(Clarkson, 1995, p. 106)

„In cooperatives, ownership rights and control power is usually assigned to one single category of stakeholders, this category however having a double economic function in the co-operative: they are both user and shareholder of the co-operative”.  

(Gijselinckx, 2009, p. 1)
R. Edward Freeman (1984) approached the question of stakeholders from two points of view:

a) wider approach:
   Stakeholders are “any identifiable group or individual who can affect the achievement of an organization`s objectives”.

b) narrow approach:
   Stakeholders are “any identifiable group or individual on which organisation is dependent for its continued survival”.

(Gossy, 2008, p. 6)
Care coops are multi-stakeholder coops!

Existing local care communities (coops)

People in need: care receivers, relatives, members of care initiatives

Formal caregivers and service providers (both private and state ones)

Municipalities

Care experts: consultants, social workers, health professionals

Actors of interest: lawyer, architects, health insurance …

*These are those who would most likely contribute and use the platform*
Addressing the diverse target groups

iCareCoops → multi-stakeholder cooperatives

Primary stakeholders → older adults managing a care coop

Ownership:
Membership open to service users and/or to other stakeholders; used as a tool to stimulate care coop culture

Governance:
Decision-making processes involving service users and providers, and other stakeholders
Our user centred system engineering approach
1. Basic understanding through secondary research

Literature research
Review of 2,000 articles
In depth analysis on 29 articles
WCAG, ISO 9241, ISO IEC Guide 71

Baseline report
Overview of different approaches and goals of (care) cooperatives
Overview of recommendations and gaps of accessibility standards
2. Deeper understanding through user involvement

**Interviews**
Primary research:
20 expert interviews
11 countries

**Focus groups**
6 Focus groups with end-users
40 participants
2 countries
3 user groups (care providers, care receivers, relatives)

**First requirements**
Identification of best practices
Definition of requirements

**Additional user requirements**
Understanding of needs and services to be supported with ICT/AAL
Understanding of organisational structure, service models and workflow processes
3. Deriving user requirements from personas

„Valentina“ – coop manager
Likes:
- Directly working with people
- Meeting friends
- Time with family

Dislikes:
- Losing market to private companies
- Not enough time for kids

„Herbert“ – physical therapist at coop
Likes:
- Football
- Beer
- Technology
- Skiing and hiking

Dislikes:
- Gain weight
- Not enough time for daughter
- Death of a patient
- Staying single

„Knud“ – receiving care
Likes:
- His dog
- Watching TV
- Short walks
- Chats with neighbours

Dislikes:
- Social isolation
- Technology
- Being a burden
- Medical emergency

„Hildegard“ – takes care of her mother
Likes:
- Gardening
- Skiing
- Hiking

Dislikes:
- Losing her job
- Accidents of family members

Demographics:
- 54 years
- Married
- Academic researcher
- Switzerland
- 2 teenage kids
- Heavily uses smartphone & tablet

Needs:
- Care for her mother
- Support in organising
- More free time
- Counselling

Goals:
- Successful coordination
- Stable environment
- Security
3. Deriving user requirements from personas

Requirements Analysis
Translate gathered knowledge into technical requirements
Consortium partners identify requirements as user stories

User Requirements Collection
Developer refines 128 user stories

As a/an <…> I want to <…> so that <…>
As a care receiver I want to have the option to contact the coop via mobile app so that it’s possible to e.g. spontaneously cancel an appointment.

<table>
<thead>
<tr>
<th>ID</th>
<th>Comp.</th>
<th>As a/an</th>
<th>I want to ...</th>
<th>so that ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUS 001</td>
<td>AAL Solution Catalogue</td>
<td>relative</td>
<td>have information centres for diseases included in or connected to my cooperative</td>
<td>I can be sure to get the best solution for the person in need of care.</td>
</tr>
<tr>
<td>RUS 002</td>
<td>AAL Solution Catalogue</td>
<td>relative</td>
<td>have reports of care services from users and providers</td>
<td>I can check the delivered services to the person in need of care.</td>
</tr>
<tr>
<td>RUS 003</td>
<td>AAL Solution Catalogue</td>
<td>relative</td>
<td>have a filter for the region of the care coops</td>
<td>I can only see local care coops.</td>
</tr>
<tr>
<td>RUS 004</td>
<td>AAL Solution Catalogue</td>
<td>relative</td>
<td>have a common nationwide system</td>
<td>every senior automatically has the option for...</td>
</tr>
</tbody>
</table>
4. Designing basic architecture and modules

Basic architecture and modules

Developer derives first version of technical architecture, modules, database and framework form user stories
UML and ER diagrams for better internal communication
5. Getting early user feedback on prototype

Verify assumptions about user groups
Gather first-hand feedback about overall usability
Identify obstacles
Paper prototype tests
including IC, background interview, post-test debrief, qualitative and quantitative assessment
Time and cost efficient test method
Identify issues of the concept early on avoiding development overhead
• 3 end-user groups
• 22 participants
• discover 70% of UI issues
• 50:50 gender split
• From tech-savvy to inexperienced
• 2 days, 1 observer, 1 tester
<table>
<thead>
<tr>
<th>Usability Criteria</th>
<th>Measurement</th>
<th>Result</th>
</tr>
</thead>
</table>
| Effectiveness     | Task completion | Fail ≥5 tasks: 5%  
                          Fail ≥3 tasks: 36% |
| Satisfaction      | Overall impression | Rank impression "Bad": 0%  
                          Rank information provided "too high": 14% |
|                   | Information load | Had many problems with the wording  
                          Miss many essential interactions |
|                   | Information missing | 18%  
|                   | Language | 18%  
|                   | Operations missing | 40%  
|                   | Reuse | 32%  
|                   | Ability of self-description | Wrong inputs |
|                   | Conformity with expectations | Misunderstand ≥5 items  
                          Experience ≥5 inconsistencies |
|                   | Helpfulness | Request help ≥16 times  
                          Request help ≥8 times |
|                   | Affect | React negative ≥3 times  
                          React negative ≥1 time  
| 5. Getting early user feedback on prototype | | 27 |
## 5. Getting early user feedback on prototype

<table>
<thead>
<tr>
<th>Usability Criteria</th>
<th>Measurement</th>
<th>10% of the participants …</th>
<th>Result</th>
<th>50% of the participants …</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effectiveness</strong></td>
<td>Task completion</td>
<td>Fail ≥5 tasks</td>
<td>5%</td>
<td>Fail ≥3 tasks</td>
<td>36%</td>
</tr>
<tr>
<td><strong>Satisfaction</strong></td>
<td>Overall impression</td>
<td>Rank impression “Bad”</td>
<td>0%</td>
<td>Rank impression “Poor”</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Information load</td>
<td>Rank impression “Bad”</td>
<td>14%</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Information missing</td>
<td>Rank information provided “too high”</td>
<td>-</td>
<td>Rank impression “poor” or “bad”</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>Language</td>
<td>Had many problems with the wording</td>
<td>18%</td>
<td></td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>Operations missing</td>
<td>Had many problems with the wording</td>
<td>18%</td>
<td></td>
<td>46%</td>
</tr>
<tr>
<td></td>
<td>Reuse</td>
<td>Miss many essential interactions</td>
<td>-</td>
<td>Had some problems with wording</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Miss some essential interactions</td>
<td>-</td>
<td>Had some problems with wording</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Would not reuse the solution</td>
<td>-</td>
<td>Would not reuse the solution</td>
<td>-</td>
</tr>
<tr>
<td><strong>Ability of self-</strong></td>
<td>Wrong inputs</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td><strong>description</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Conformity with</strong></td>
<td>Misunderstandings</td>
<td>Misunderstand ≥5 items</td>
<td>9%</td>
<td>Misunderstand ≥3 items</td>
<td>55%</td>
</tr>
<tr>
<td><strong>expectations</strong></td>
<td>Inconsistencies</td>
<td>Experience ≥5 inconsistencies</td>
<td>0%</td>
<td>Experience ≥3 inconsistencies</td>
<td>18%</td>
</tr>
<tr>
<td><strong>Helpfulness</strong></td>
<td>Requests for help</td>
<td>Request help ≥16 times</td>
<td>0%</td>
<td>Request help ≥8 times</td>
<td>18%</td>
</tr>
<tr>
<td><strong>Affect</strong></td>
<td>Negative emotional</td>
<td>React negative ≥3 times</td>
<td>5%</td>
<td>React negative ≥1 time</td>
<td>50%</td>
</tr>
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</table>
Re-evaluating usability heuristics

1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose, and recover from errors

Our key takeaway: Focus on one target group!
Example: Improved control through process steps
Example: Error prevention through new navigation
6. Optimising technical specification

Use Case Design
Detailed exploration and specification of system
Enables internal communication and planning of implementation

User Interface Design
Detailed specification of grid, navigation, icons, colours
UX styleguide with focus on accessibility

Software specification
“Are we building the product right?”

Optimisation to reach TRL-7:
Prototype demonstration in operational environment

- 2 iterations of 3 pilot field tests with care coops including 4 end-user groups
- Pilot iteration 1 with core functionality for managers
- Pilot iteration 2 with all features
- Methods: Thinking aloud, video observation, reflection models, motivational interviews
Our user centred system engineering approach

Secondary research

Primary research

User stories

Basic architecture

Prototype tests

Specification

Implementation

Iterative pilots
<table>
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<th>Time</th>
<th>Session</th>
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EXPERT WALKTHROUGH WITH HEURISTIC EVALUATION

Objective: Identify usability problems of current prototype

Measures: Number and severity of problems
Nielsen/Molich 10 principles

Method: Walk through set of tasks via printed prototype

Participants: 3 groups of 5 experts each
Heuristics to consider during the walkthrough

1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose, and recover from errors
10. Help and documentation

(Nielsen/Molich 1990)
Measuring severity of identified usability problems

- **Catastrophe**: 0
  - show-stopper

- **Major problem**: <3
  - significant potential impact on usability

- **Minor problem**: <15
  - low priority, but should be noted

- **Cosmetic problem**: <20
  - fix if there’s time and it’s easy
Expert walkthrough step-by-step

Get together in 3 groups

Group leader guides you through prototype tasks

Point out any usability concern right away

Each group evaluates findings (heuristic principle, severity)

Each group presents overall count and top-3 findings
1. Introduction to the iCareCoops approach
9:00 – 9:30

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9:30 – 10:00

3. Discussion of lessons learned
10:00 – 10:30
What methods or tools proved useful from your previous experience and from today’s workshop?
What would be the reason for you or a close relative to become a cooperative member?
Workshop objective:

Participants have a better understanding of end-user involvement throughout the system engineering process in the diverse AAL landscape and got to know methods and tools they can employ in their projects.


Recommendations
Thank you and enjoy the rest of the AAL Forum!

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