Experience Research: a Methodology for Developing Human-centered Interfaces

Boris de Ruyter and Emile Aarts

Bahram Yousefi

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Challenges for AmI

Human cantered technology is not still balanced

- **Needs more technological advancements (SWAMI)**

security problems

- **Who is in charge (implementing)?**
- **Privacy**
- **Integration**
- **Information Filtering or censorship?**

Research Cycles

- **Phases are different from classical methods**
  - **Context studies**
    - **Collect user insights and requirements**
    - **Without introducing new technologies**
  - **Lab studies**
    - **Test usability and user acceptance**
    - **Evaluation of new proposition in controlled settings**
  - **Field studies**
    - **Validate and study longer term effects**
    - **Evaluation of new proposition in real life settings**
- **These steps are iterative**

ExperienceLab

HomeLab

- It has a living, kitchen, two bedrooms, a bathroom and a study room
- Two-stock house with 34 cameras and 30 microphones
- Observers will capture and then analyze data

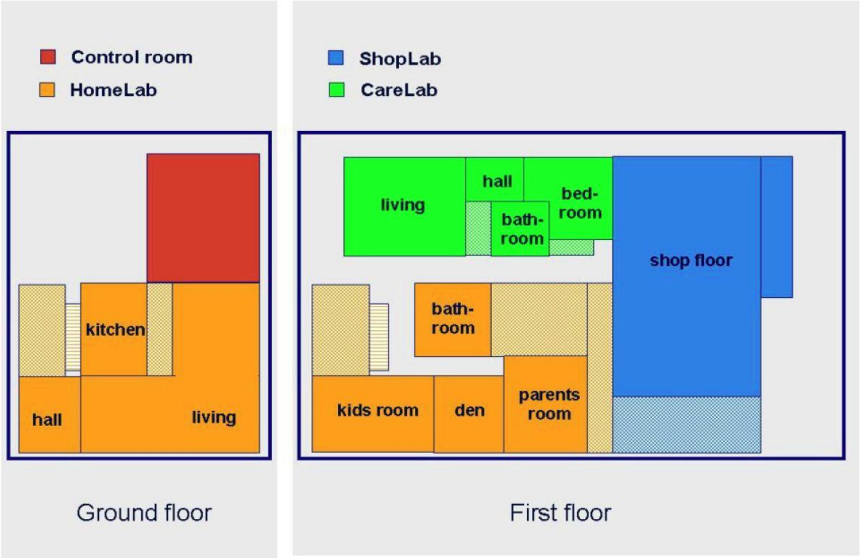
ShopLab

- LED lighting
- Interactive shop windows
- Detect peoples presence and product interests

ExperienceLab (Cont)

CareLab

- Equipped with a rich sensor network
- It will collect behavioral pattern related to activities and states
- It will help to improve applications and eliminate imperfections



Assessment method

Usability test of a video editing system

40 participants who were unfamiliar with ExperienceLab

There were two sessions separated for one week

They were told that the system will be improved but only minor changes made

Groups assigned to work with the ExperienceLab and/or traditional lab (Halo eff.)

Assessment method (Cont)

	Session 1		Session 2
Group 1	ExperienceLab	→	ExperienceLab
Group 2	ExperienceLab	→	Laboratory
Group 3	Laboratory	→	ExperienceLab
Group 4	Laboratory	→	Laboratory

A set of questionnaires preceded by a short introductory

Materials

- **Brief Mood Introspection Scale (BMIS)**
- **Software Usability Measurement Inventory (SUMI)**
- **Pleasure, Dominance and Arousal scale (PDA)**
- **NASA Task Load Index (TLX)**
- **(Dis)confirmation of Expectations**

Results

Brief Mood Introspection Scale (BMIS)

Table 1 Mean group scores on mood state corresponding to session 1 (score is at least 1 and at most 7; $N_{group} = 10$)

	Group 1	Group 2	Group 3	Group 4
Session 1	3.62 (0.38)	3.64 (0.38)	3.80 (0.36)	3.68 (0.47)

Table 2 Mean group scores on mood state corresponding to session 2 (score is at least 1 and at most 7; $N_{group} = 10$)

	Group 1	Group 2	Group 3	Group 4
Session 2	3.67 (0.25)	3.79 (0.45)	3.84 (0.32)	3.76 (0.63)

Results (Cont)

Software Usability Measurement Inventory (SUMI)

Table 3 Mean scores on *satisfaction*(based on SUMI) corresponding to session 1 (score is at least 1 and at most 3; $N_{group} = 10$)

	Group 1	Group 2	Group 3	Group 4
Session 1	2.45 (0.26)	2.41 (0.23)	2.40 (0.15)	2.55 (0.17)

Table 4 Mean scores on *satisfaction* (based on SUMI) corresponding to session 2 (score is at least 1 and at most 3; $N_{group} = 10$)

	Group 1	Group 2	Group 3	Group 4
Session 2	2.47 (0.20)	2.40 (0.14)	2.40 (0.25)	2.50 (0.27)

Results (Cont)

Pleasure, Dominance and Arousal scale (PDA)

Table 5 Mean scores on *feeling evoked by environment* corresponding to session 1 (value is at least 1 and at most 7; $N_{group} = 10$)

	Group 1	Group 2	Group 3	Group 4
Session 1	4.44 (0.59)	4.55 (0.45)	4.34 (0.73)	3.99 (0.52)

Table 6 Mean scores on *feeling evoked by environment* corresponding to session 2 (value is at least 1 and at most 7; $N_{group} = 10$)

	Group 1	Group 2	Group 3	Group 4
Session 2	4.42 (0.57)	4.28 (0.65)	4.55 (0.70)	3.59 (0.49)

Results (Cont)

NASA Task Load Index (TLX)

Table 7 Mean task load values corresponding to session 1 (value is at least 5 and at most 100; $N_{group} = 10$)

	Group 1	Group 2	Group 3	Group 4
Session 1	26.67(13.56)	31.08(9.92)	33.58(11.08)	26.67(12.90)

Table 8 Mean task load values corresponding to session 2 (value is at least 5 and at most 100; $N_{group} = 10$)

	Group 1	Group 2	Group 3	Group 4
Session 2	18.47(5.64)	31.50(9.52)	27.33(9.33)	26.17(11.62)

Results (Cont)

(Dis)confirmation of Expectations

Table 9 Mean scores on *disconfirmation of expectations* measured in session 1 (value is at least 1 and at most 7; $N_{group} = 10$)

	Group 1	Group 2	Group 3	Group 4
Session 1	4.40 (1.17)	4.80 (1.09)	4.45 (1.09)	5.05 (0.93)

Table 10 Mean scores on *disconfirmation of expectations* measured in session 2 (value is at least 1 and at most 7; $N_{group} = 10$)

	Group 1	Group 2	Group 3	Group 4
Session 2	3.90 (0.91)	5.15 (1.31)	4.20 (0.95)	4.35 (1.11)

ExperienceLab Discussions

- There were no statistical significant difference between ExperienceLab and traditional lab usability measures
- Both of the systems have same evaluation points
- Video editing and filling the quastionaires go most attention
- Low attention to environment
- Results are not biased by the testing environment

Case study of the Experience Research Approach

Appling ER cycles in domain of Ambient Assisted Living solutions

Well functioning social networks of people with a major change in their life

Users are elderly people who have recently retired and have an active social networks

Context-mapping

11 elderly recruited

They worked on a social network poster 10 min a day for one week

After the first week they interviewed

In second week they work on the poster with a companion

After the second week both the member and companion interviewed

At this point they may exposed to today technologies

Cluster and analyze

- Strong need for recognition
  - Being useful
  - Being included
  - Confirmation of status
  - Mutual appreciation
- Need for being independent
- Need to experience general satisfaction
- What made a social network satisfying and rewarding?

Lab Study

- In depth research on how participants maintain and expand social networks
- The main topics here are social recognition and appreciation
- Interactive television channel
  - Members can post short messages and pictures
  - Others can rate the postings
  - Only limited number of posts is allowed
  - The interface is a simple remote control

Field Study

The prototype were installed in six homes and was available for 8 days

Basic functionalities explained

Daily questionnaires were measuring the appreciation received from social network

Unexpected behaviors were find

Case Study Discussion

- AmI calls for far-reaching multi-disciplinary and integrative approach
- Complexity of AmI may not be tractable
- Implementation will be infeasible unless more innovative solutions becomes available
- Contextual study help better understanding of literature on how end users could use social networks
- Lab study showed how user used the prototype
- Field study showed the actual use of the system and its effectiveness to response to people

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