

Development of clinical scenarios utilizing Participatory Design for the use of a wearable sensor

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Agenda

- Aim
- State-of-art
- Collaboration partners
- Methodology
- Clinical evaluation
- Preliminary results

Aims of the project

- Develop a platform for an Electronic Patch
- Develop integrated sensors for:
 - Oxygen saturation
 - Electromyography (EMG)
 - Electrocardiography (ECG)
- Test a prototype of an Electronic Patch in clinical settings
 - Technical
 - Clinical
 - Patient

Research and innovation project

- Three years project
- The Electronic Patch project
 - Biocompatible patch
 - Micro electronics with integrated sensor
 - Systems and services



Remote monitoring (1)

- Clinical topics of concern
 - Out-patients with chronic heart failure
 - Monitoring of weight and blood pressure
 - Visits at heart failure ambulatory for medicine adjustment
 - Patient specific treatment

Remote monitoring (2)

- Assumptions when out-patients with chronic heart failure are monitored by an Electronic Patch:
 - The frequency for out-patient visits at ambulatory decreases
 - Better clinical evidence for medicine adjustments
 - Due to higher frequency of measurements
 - Due to patients are monitored in own surroundings

State-of-the-art (1)

- **Telehomecare technology**
 - Provides better clinical evidence when patients are home hospitalized [1]
 - Promotes process of “getting back to everyday life, physically and mentally” [1]
- **Portable/wireless ECG monitoring**
 - Holter recorder with integrated mobile GSM module (Schiller MT-120 GSM) [2]
 - Wireless ECG as a wearable sensor including arrhythmia detection [3]
 - Body Area Networks that monitors several vital parameters as oxygen level, pulse and temperature [4;5]

State-of-the-art (2)

- Telehomecare studies have been conducted, but only with modest conclusion regarding clinical and organisational effects [1]
- Assessment in this project:
 - Patients experience using telehomecare technology
 - Clinical usage and validation
 - Legal and ethical “obstacles” that might arise utilizing an Electronic Patch to monitor chronic heart patients

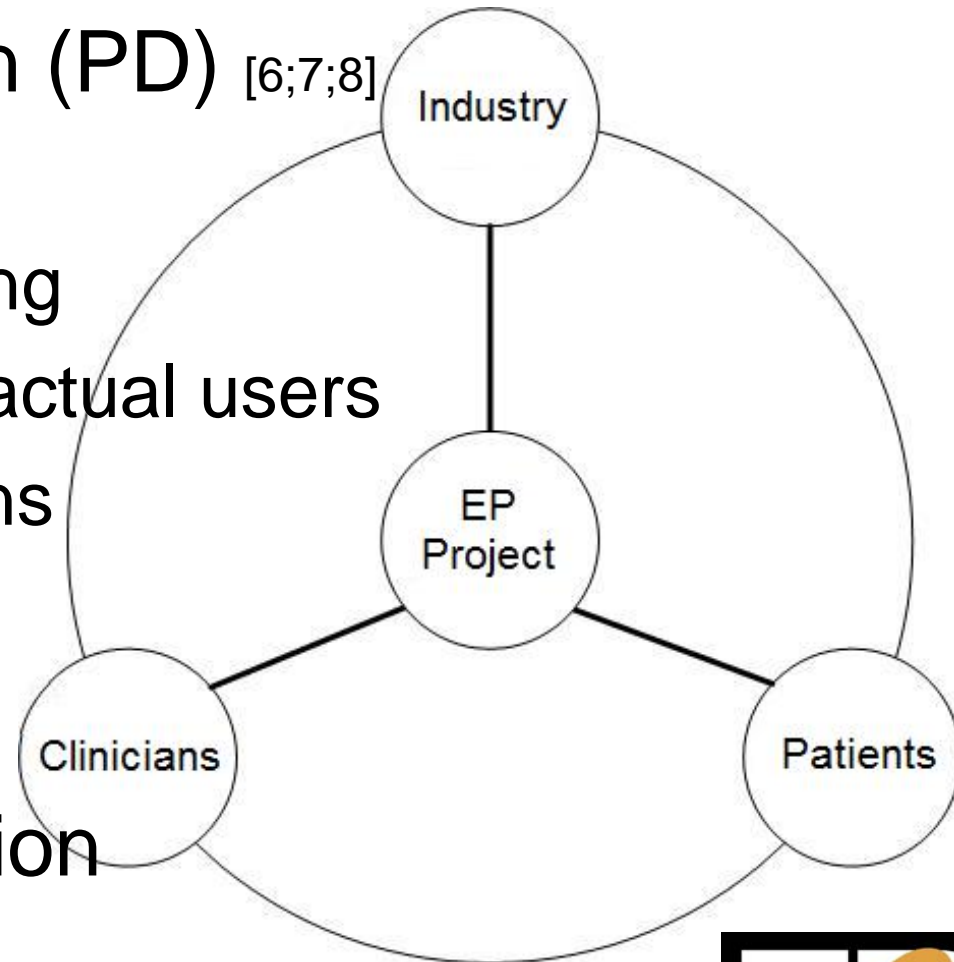
Collaboration partners

- Academic institutions
- Industry partners
- Public health care sector
- Private health care sector
- End-user



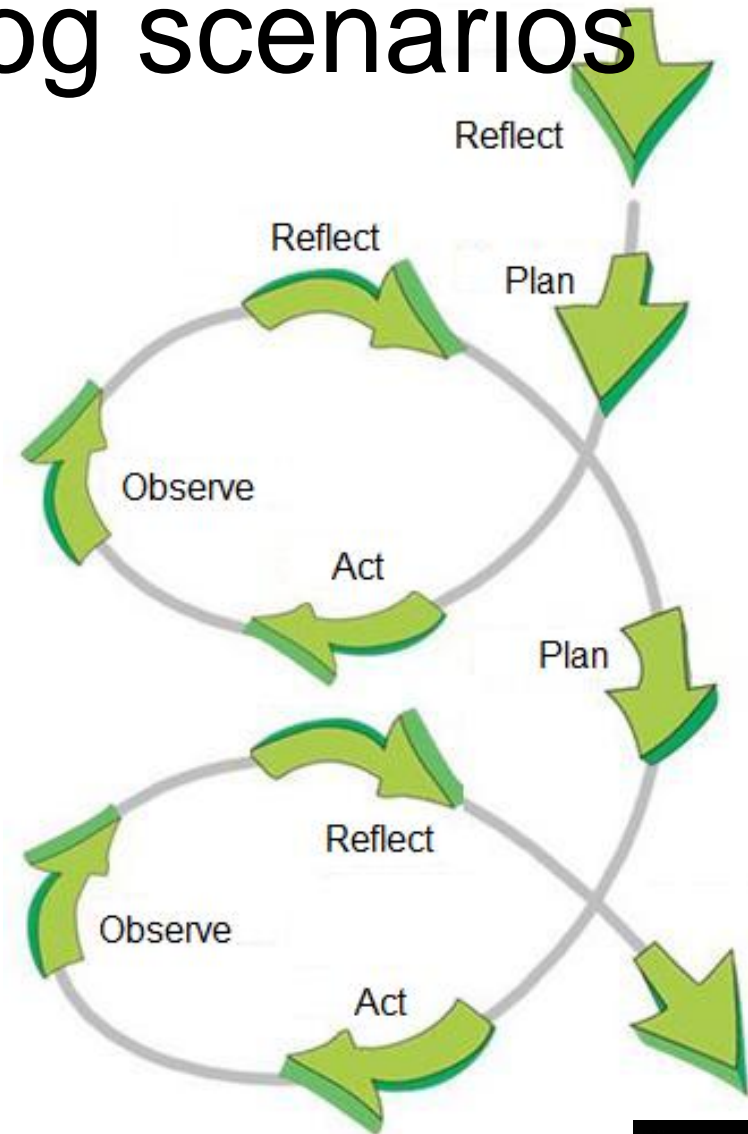
Methodology

- Participatory Design (PD) [6;7;8]
 - User involvement
 - Mutual understanding
 - Design experts vs. actual users
 - Centralized decisions



- Design and motivation

Development og scenarios

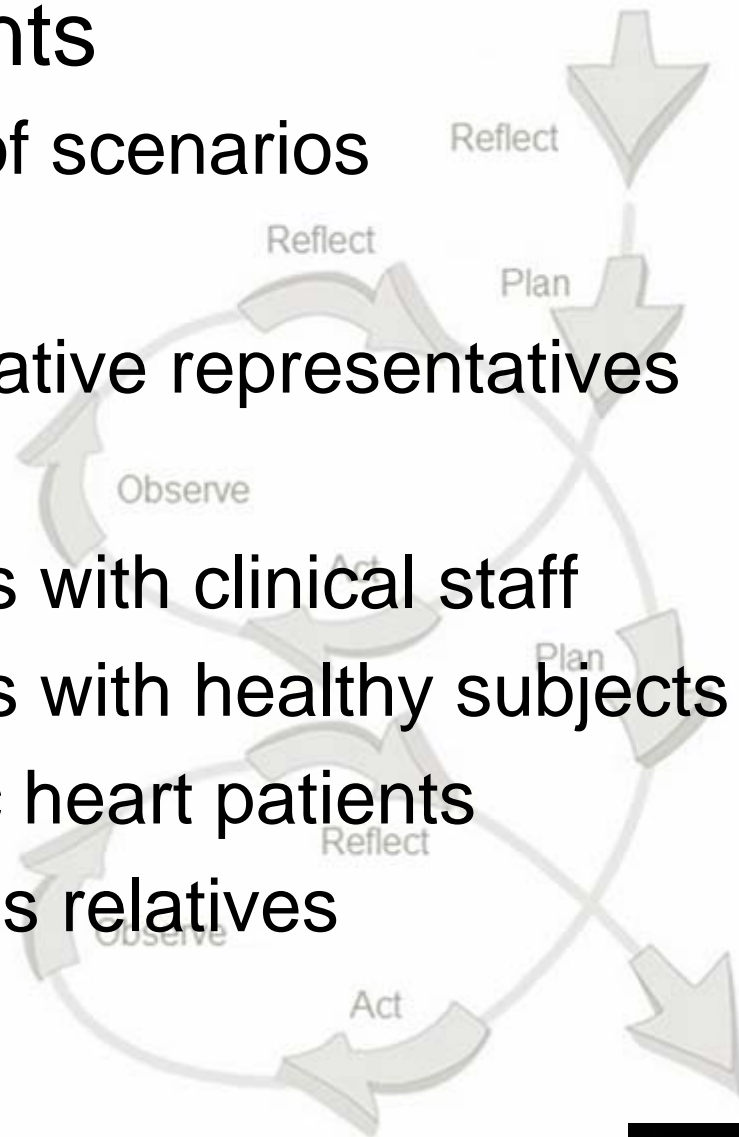


Remote monitoring of chronic heart patients

Development of scenarios

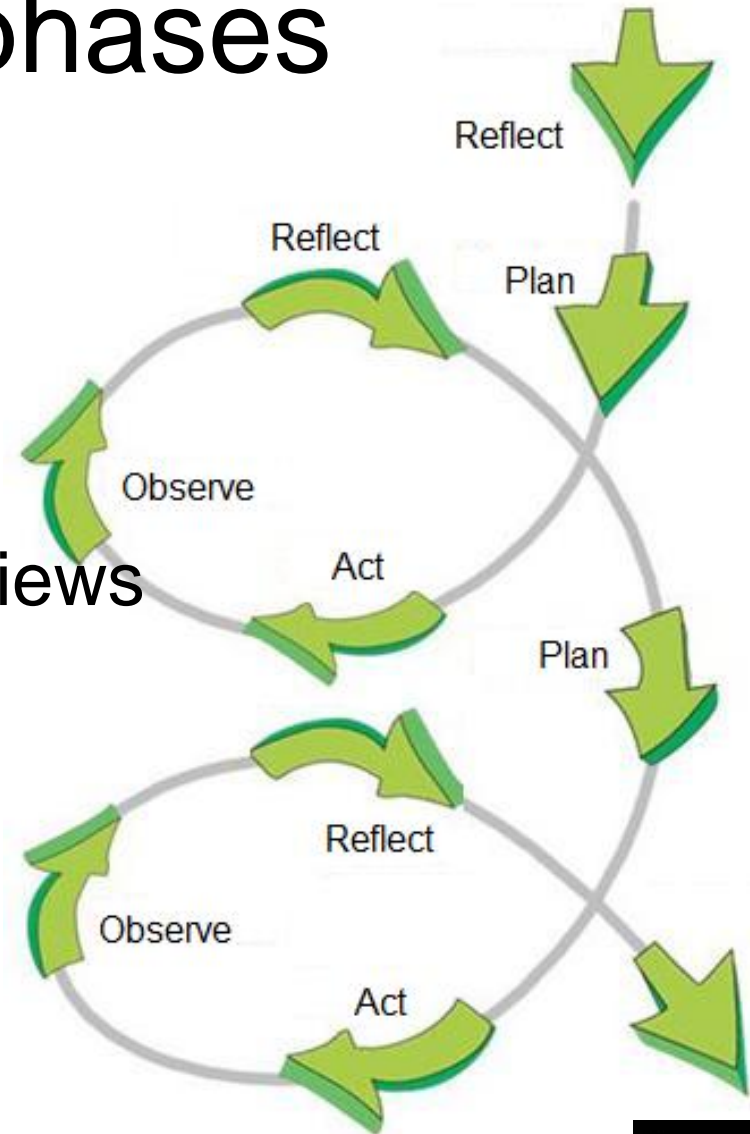
- Collection of data

- Meetings with collaborative representatives
- Workshops
- Focus group interviews with clinical staff
- Focus group interviews with healthy subjects
- Interviews with chronic heart patients
- Interviews with patient's relatives

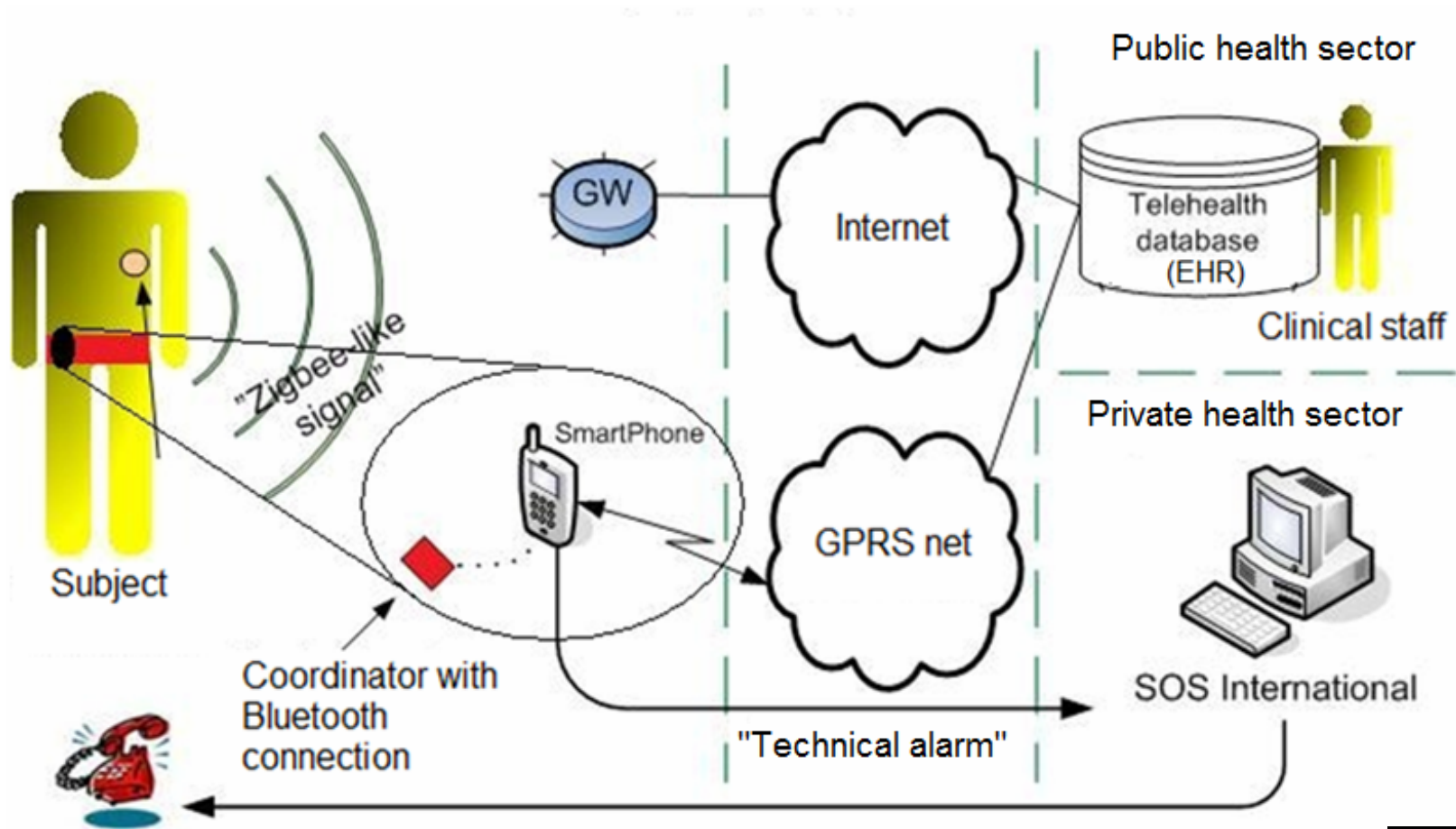


Project phases

- Phase 0
 - Identify requirements through workshops and focus group interviews
- Phase 1
 - Laboratory setup
- Phase 2
 - Clinical setup



Remote monitoring of chronic heart patients - developed scenarios



Remote monitoring of chronic heart patients

Phase 1

- Laboratory setup at Aalborg University
 - Demonstrate technical capabilities in the laboratory
 - Explore the usage of the Electronic Patch on healthy subjects
 - Identify barriers between public and private health care sector
- Six healthy subjects

Remote monitoring of chronic heart patients

Phase 2

- Clinical setup at Sygehus Vendsyssel, Frederikshavn
 - Demonstrate technical capabilities at home
 - Investigate the patient's experience when wearing the Electronic Patch
 - Identify clinical possibilities and limitations when monitoring chronic heart patients with an EP
- Ten out-patients diagnosed with chronic heart failure

Preliminary results and discussion

- Initially relatively slow technical progress
 - Assembly of representatives
 - PD proves most effective in early stages
- PD provides different “views of the World”
- PD promotes needed cross-disciplinary insight to develop an EP that meets demands:
 - Technically
 - Organisationally
 - Clinically

Funding and contact information

- The project was funded by Danish Agency for Science, Technology and Innovation
- Contact information
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Quistions?

Thank you for your attendance