User evaluations to improve Patient-centred IT

*APRI eHealth*

**DOME**
- Deployment of Online Medical records and Ehealth services

2013-11-13 Lecture 4: 13.15-15.00 (6111)
Usability in Health Informatics

- Introduction – HI / MI
- User Evaluations
- Assignment
- Q&A
- The usability standard
- UCD methods
- Guidelines
- Importance of evaluation
- The Case: DOME
RECAP and a look ahead! (1/2)

What was, according to you, the most important of last lecture, #3?

- Talk to your neighbour about your ideas of
  - Good and secure care? How can we support/provide care?
  - Usability in Health informatics - usability standard 9241-11

- The vision of good eHealth?
- Healthcare supported by an HCI framework?
- User centricity vs. Patient-centred IT?

- What do you already know of system evaluations? User evaluations?
RECAP and a look ahead! (2/2)

What was, according to you, the most important of last lecture, #3?

- Methodologies from HCI (ISO 9241-201)
  - User Centred Design
  - Participatory Design
  - Cooperative work
  - Multi-stakeholder involvement
  - Socio-technical approach

- What do you already know of evaluation criteria? Heuristics?
It’s all about understanding eachother…  ;-)
Vision for good eHealth / 7 R:s + 1

- Right care professional can – with an easy operation - get
- Right information about the
- Right patient at the
- Right place in the
- Right amount, presented in a
- Right way, adapted to
- Right situation

To support a good patient meeting and cooperation between different care actors.

And, the information should be registered only once and with little effort and time consumption.
User Centred Design (UCD)

– Work with **real** users
– Focus on **real** work (or use) situations
  • What is required in each situation?

➢ User needs & context analysis – requirements gathering

➢ Design
  • How to design to meet the demands and requirements?
  • Participatory Design
  • Sketches and user interface views → prototypes

➢ Evaluations should be agile and iterative
Multi-disciplinary collaborative design process

- How can users’ needs and the system context be elicited in order to improve inter- and intra-professional work?

- Pieces from UCD:
  - Observations
  - Participatory Design
  - Prototyping
  - Iterative assessments

- Socio-Technical &
- CSCW-approaches
  - Analyses
Capturing Integrated Work Processes

Pre-seminar work

Thematic seminar series

Iterative prototyping

Care Professionals and researchers/analysts
Intra and inter-professional working groups

Collaborative design method $\rightarrow$ support many professions
- Extensive work analyses
- Needs in intersection points

$\rightarrow$ Transfer user needs to Req. specification
- Specification of work scenarios
- Validated prototypes
What to consider to be able to provide good home care?

- **Elderly at home**
  - Feel safe and participate!

- **Home helpers**
  - Read, write, communicate!

- **Relatives**
  - Participate in the care process and are updated!

- **Nurse**
  - Has access when working in the field!

- **Physician**
  - Reads updated info!
Informatics and socio-technical challenges when designing solutions for integrated eCare
Multi-stakeholder involvement

The Usability Aspect

- To whom?
- In which situation?
  - In which context?
- To solve which issue/task?

→ Agreed requirements/goals
→ Validation of decisions &
→ design solutions

ISO/IEC/IEEE 42010:2011,
Minimum set of stakeholders

Isabella Scandurra

User groups

Buyers/owners

Developers

Operational services
Participatory Design (PD)

“The focus of PD is not only the improvement of the information system, but also the empowerment of workers so they can codetermine the development of the information system and of their workplace” (Clement and Besselaar 1993)

UCSD and PD

Specific users ICT systems Design/Development FOCUS on usability of ICT (Also without user participation)

Workers/ Professionals FOCUS: Work processes Work in its context Always participation of users (Observations)

Isabella Scandurra
Patient-centred care? Patient-centred IT?

- Patient-centeredness of healthcare is a well-established and non-controversial quality characteristic ensuring that care should be respectful of and responsive to
  - individual patient preferences, needs, and values,
  - and ensuring that patient values guide all clinical decisions.

- Many initiatives provide patients with access to health information and other services from a healthcare perspective, rather than a patient-perspective
  → what information is available to provide to patients - rather than what they actually want
  → and what information healthcare professionals want to monitor - rather than what the patients want to tell their healthcare professionals.

Do not look at the patient...

...look in the same direction as the patient!

Isabella Scandurra
UCD for Patient-centred IT

- Design of an eHealth service should be based on
  - an explicit understanding of the patient,
  - the patient’s health-related tasks/activities and environments.

- Not only limited to the interaction with healthcare,
  - a deep understanding - of where and how the patients are to use the system.

- Patients are involved throughout design and development.
  - Make sure to recruit and actively involve real patient representatives throughout the design process.
  - The design is driven and refined by patient-centered evaluation.
  - It is imperative to perform formative evaluations with patients to ensure that the proposed eHealth solutions meet their needs.

- The design addresses the whole patient experience.
  - Take into consideration how this eHealth system fits into the patient’s entire healthcare journey. Do not focus exclusively on the health objectives deemed important from a healthcare professional perspective; consider the needs and preferences of the patients who will actually use/or be part of/ the system.
The most important questions in usability?

- To whom?
- In which situation?
- Solving which task?
Evaluation

Assessment
- Evaluation
- User evaluation
- Inspection
- User review
- Verification
- Experiment

Validation
- User study
- User test
- Experimental study
- Usability test
- Expert review
- Usability evaluation
- Controlled experiment
Evaluation - definition

"To determine or fix the value of…"

"To determine the significance, worth, or condition of, usually by careful appraisal and study"

(merriam-webster’s online dictionary)

"Evaluation can be defined as the act of measuring or exploring properties of a HIS (in planning, development, implementation or operation),

The result of which informs a decision to be made concerning that system in a specific context.”

(Ammenwerth et al. 2004)
Evaluation methods for HI

Formative (constructive)
– during the actual design process
– (or entire cycle)
– with the purpose of finding usability problems to be dealt with and to control a dynamically changing development process

In contrast to a
Summative evaluation
– which is made when a design is finished
– to assess the result (objectives fulfilment)
– Comparison btw specification and deliverables
Why evaluate?

Be humble:

→ no matter how you think your design is good, there will always be something you overlooked!

- Check if the users can use the product
- Problems are fixed before it is taken into operation
- Development time is reduced

Usability evaluation is a central part of all user-centered development – early and iterative!

Evaluation with potential users is key to a successful product!
Why perform an evaluation?

If you do not know your purpose of an evaluation — DON’T DO IT!
Two main purposes of usability evaluation

- Find (potential) usability problems that users encounter in "real use"
  - likely existing problems
    (there exist no estimation of frequency among users)

- Measure usability towards usability goals
  - established usability goals (from requirements, assumed etc)
  - competitive product
  - actual usability problems
Plan, plan, plan! → Plan your work

Estimated amount of resources, Inspired by the RUP model regarding resources spent in requirements analysis

Isabella Scandurra
Evaluation examples

- Is the product/application used as expected?
- Does the users think that the product is easy to use?
- Are the users satisfied with the layout of the interface? What causes problems to users?
- How long times does it take to perform certain tasks?
- How many errors / how often do users make errors?
- Is there a difference between these alternatives? Are they substantial or only minor?
- Is this approach good enough or should I keep working at it?
- What changes will improve the product (the most)?
Usability standard ISO 9241-11 in practice

Based on this standard we can assess how

- effective, [do the users reach their goals?]  
- efficient and [resources spent in reaching goal..?]  
- satisfactory [are they satisfied when doing that?]

a product is,
in order to be considered as having good usability for:

→ A specific group of **users**
→ performing specific **tasks**
→ in a specified environment/**context**
Usability Evaluation methods

**Usability testing methods**
- *users involved*
  Think aloud, Observations,
  Pluralistic Walkthrough,
  Questionnaires,
  Usability Lab measurements…

  + Find actual problems as
    Users are aware of practical work
  - Difficult see beyond existing system
  - *(Lab)* Expensive if real users…

**Usability inspection methods**
- *no users, but experts*
  Cognitive Walkthrough,
  Heuristic Evaluation

  + Time and cost -effective
  - Identify domain specific problems
    - effective & efficient in daily work
  - No solution to potential problems

  → Propose design solutions ?
  → Add a “Potential User Analysis” ?
  → Use Double experts ?

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When to evaluate?

It depends on the goals you have…

- Design a new tool/product?
  - Establish requirements
  - Initial sketches, paper prototypes of design ideas
  - Evaluate them (are the design ideas suitably matching the requirements?)
  - Collect feedback and results, re-design

- Upgrade of existing tool/product?

- Improving specific features?
  - Start with an evaluation, then re-design
An example: Heuristic Evaluation

Can be conducted at any development stage
→ Identify potential usability problems

An expert panel – 3-5 persons
– Usability experts, domain experts or ”double experts”
– Using the guidelines, evaluate / analyze the identified problems…

…find ~ 85% of usability problems (Nielsen)

www.useit.com "Test with 5 users" Alertbox March 2000
Prioritize! Make severity ratings!

1. Cosmetic problem only  → if extra time…
2. Minor usability problem  → low priority fixing
3. Major usability problem  → redesign!
4. Usability catastrophe  → Imperative to fix!
The Heuristics (Design Principles)

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

(Nielsen, Heuristic evaluation, 1994)
What was the important?

- Evaluate!
  - With a well defined purpose
- With relevant users!
- Performing relevant tasks!

- Evaluate often (iterate)!
Summary: What was the important?

THINK while working!

- Who are your users?
- What goals do they want to reach?
- In which situation?
- Using which tools?

- Plan and replan!
- Be iterative and agile!
- Learn from mistakes!
- Test and improve!
Lecture materials

- Building usability into health informatics (Isabella’s thesis)
  
  http://publications.uu.se/abstract.xsql?dbid=8403

- Methodological Review (Kushniruk & Patel)
  - Cognitive and usability engineering methods for the evaluation of clinical information systems.
  
  *Journal of Biomedical Informatics 37 (2004) 56-76*

- Jytte Brender:
  - Handbook of Evaluation Methods for Health Informatics, 2006
  - Trends in assessment of IT-based solution in healthcare and recommendations for the future
  
  *Int. Journal of Medical Informatics 52 (1998) 217-227*

- Bonnie Kaplan:
  - Evaluating informatics applications - clinical decision support systems literature review.
  
  *Int. Journal of Medical Informatics 64 (2001) 15-37*
Continue to read about evaluations

- **Human-Centred computing in health information systems – part 2: evaluation** (J. Zhang)

9 articles+

- Evaluating user interactions with clinical information systems: a model based on Human-Computer interaction models.
  - Despont-Gros, Mueller, Lovis
  - *Journal of Biomedical Informatics* 38 (2005) 244-255

- Cognitive evaluation: How to assess the usability of information technology in healthcare.
  - M. Beuscart-Zéphir
  - *Computer Methods and Programs in Biomedicine* 54 ('97)19-28

  - Ammenwerth E, de Keizer N.
Articles: Examples from Scandurra’s method, results and evaluations


- Participatory design with Seniors: Design of future services and iterative refinements of interactive eHealth Services for old citizens. Journal of Medicine 2.0 vol 2 (2)


- Evaluation of OLD@HOME Virtual Health Record: Staff opinions of the system and satisfaction with work. Journal of Telemedicine and eHealth, 2009;15(1) 53-61

- From user needs to system specifications: MdTS as collaborative design method for development of health information systems. Journal of Biomedical Informatics, 2008: 41 (4) 557-569


- Visualization and interaction design solutions to address specific demands in shared home care. Stud Health Tech Inf, Vol 124, 2006, 71-76

Assignment, logistics

- **Step 1:** Form groups of 5 persons. This should be done **latest Monday Nov 4**. Each group should send an (one) email to Bengt Göransson (Bengt.Goransson@it.uu.se) and Isabella Scandurra (Isabella.Scandurra@it.uu.se) latest Nov 4, with a list of the group members’ names. Write “Medical Informatics” on the subject line.

- **Step 2:** You must specify your assignment and get an approval before starting the assignment work. Also here, write an email to Bengt.Goransson@it.uu.se & Isabella.Scandurra@it.uu.se and specify your assignment, the application area, contact persons and a few lines about how you plan to perform your assignment project. You will get a reply with an OK or some advice how to proceed. This should be done **latest Monday Nov 11**.

- **OR ASAP!**
Teams?

- Journaldelen av ett system med namnet Siebel som används inom vården av Uppsala kommun
- Search and analyse EHR (SUSTAINS) data
- Review of mobile Health applications related to Mobile/ UC Design Guidelines
- To be defined ...
- Mobile interface design of personal EHRs - Students chose design tools and degree of mockup/prototype level.

Topics?

- Specify your assignment
- the application area, contact persons and
- Project plan (how to perform the assignment)

Specify your project → .DOC and
Send in the report → a .PDF
Assignment – hand in and presentation

The presentation of your assignment work must be made both \textit{orally} and in \textit{written} form.

- The written report will normally be approx. 6-10 pages, a PDF-document.
- Send the written report by mail to Bengt Göransson (Bengt.Goransson@it.uu.se) and Isabella Scandurra (Isabella.Scandurra@it.uu.se) no later than \textbf{Monday Dec 9, 13.00}.

- The oral presentation is specified in the course schedule (\textbf{Wednesday December 11}).
  - Plan for 10 minutes presentation of your work and 5 minutes for questions
  - It’s mandatory to stay during all presentations, not just your own group.

- There is also a written examination which takes place on Wednesday December 11.

- The projects that have LUL (County Council of Uppsala) as a customer need to present their work at a special “LUL occasion”. \textit{To be announced.}
The written report – outline suggestions

- **Abstract** – Short summary.
- **Background** – Describe the application area and the system you study.
- **Problem description** – Describe the problem you find outgoing from the users’ perspective.
- **Describe the system** under study in more detail.
- **Analysis** - Describe the method, the analysis and the results. This should be related to usability issues.
- Describe your **ideas for improvements** of the system, how the usability problems could be solved. Give some preliminary descriptions of what the solution could look like. Motivate and try to evaluate your ideas.
- **Discussion**. – For instance: Potential different solutions or things you could have done alternatively. Knowledge you gained during the work that is worth bringing forward.
- **Conclusion** – a short section describing your most important findings.
- **References** – interviews as well as other sources should be stated.
DOME
Deployment of Online Medical Records and E-Health Services

A multi-disciplinary research project

Isabella Scandurra
2013-11-13
SUSTAINS – EU Deployment Project (2012-)

• First practical implementation of this kind in Sweden
  – Providing your Health Record on the web → Public eHealth Services
  – 16 partners in 11 countries → deploy eHealth by 2014

DOME – a research project (2012 Aug)

• Multi-disciplinary explorative research approach:
  – Studies as constructive evaluations → recommendations
  – Previous experiences of development and deployment of IT-systems in healthcare as well as public eServices
  – User centred approach (Professionals/Patients/Relatives)
a Multidisciplinary Research Consortium

Senior researchers from different areas
- Information Management
- Human Computer Interaction
- IT and work environment
- Management studies
- Business studies
- Users in eGovernment

Qualitative and Quantitative
- Information technology
- Medicine
- Information Security
- Organization theory
- Engineering Education
- Medical informatics
(e)PACEIT

Support USers To Access Information 'N' Services
EU deployment project

European PAtient CEntred IT
International Academic consortium

DOME

SUSTAINS

PAtient CEntred IT
Swedish National Academic Consortium

Deployment of Online Medical records and Ehealth services
Multi-disciplinary Research project
EU SUSTAINS Deployment Project

Digital Agenda for Europe – A Europe 2020 initiative EU’s strategy to help digital technologies deliver smart, sustainable and inclusive growth.

**Funding Programme:** ICT Policy Support Programme (PSP) as part of the Competitiveness and Innovation framework Programme (CIP), Pilot Actions

- **Total cost:** € 6.99 m, EU contribution: € 3.5 m
- **Project Duration:** 3yrs: (Jan 2012 - Dec 2014)
- **Coordinator:** Uppsala County Council, Sweden

benny.eklund@lul.se
Aim & Objectives

Developing and deploying a basket of services in 11 European regions based on patients’ access to EHRs

**Empowerment of patients**
- There is a growing tendency by patients and the public to question information from the health system, ask for a second opinion, demand respect and dignity in their treatment, expect convenience, etc.

**Quality of Care**
- New progress in healthcare means that the patients demand and the healthcare professionals want to offer the best quality of care.

**Efficiency and economy**
- There is a growing demand from patients/citizens for improved efficiency and economy

SUSTAINS

16 partners in 11 regions

- 2 national bodies involved from Estonia and Slovenia;
- 8 regional-level bodies from the following regions:
  - Uppsala County, (SE project leader),
  - Region of South Denmark (DK),
  - Aragon (ES),
  - Basque Country (ES),
  - Scotland (UK),
  - Thessaly and Central Greece (GR),
  - South Karelia (FI),
  - Norrbotten (SE);
- One local-level body: Asolo – Veneto Region (IT)
- Some regions are supported by eHealth competence centers
- 4 European-level organizations, including European Patient Forum.
European Patients’ Forum

EPF - http://www.eu-patient.eu/

Umbrella organization of 55 pat org in EU

Requirements’ identification
- focus groups in various regions

Assessments:
- Patient empowerment survey
- User satisfaction survey

Here: Associated with use of patient accessible EHR’s
• DOME is a collaborative research project between the University of Lund, Skövde and Uppsala.
• 10 senior researchers + 3 PhD students
• Financial support by VINNOVA – Innovation board in Sweden
• July 2012 to Dec 2016 (at least..)

• DOME is conducted in close cooperation with the EU project SUSTAINS in Uppsala
• 23 ongoing studies in 3 work packages
• Increased focus on the national services
Development of Online Medical records and E-health services

DOME project Purpose and Studies:
To produce and disseminate knowledge about adaption and use of health records online and other public eHealth services aiming to benefit both patients and healthcare organizations

A. Patients and relatives (R-M Åhlfeldt, Skövde)
B. Professionals and Management (G Erlingsdottir, Lund)
C. IT Development and Deployment (Å Cajander, Uppsala)
Multidisciplinary Research Group

- Uppsala University, Department of ABM
- Lunds University, Department of design sciences
- Ture Ålanders Med. sciences at Uppsala University
- University of Skövde, School of humanities and informatics
## Organisation of Reference groups

### Overarching
- Passively receives information from project
- Invited to yearly meetings and events
- **Eight organizations:** Näringsdepartementet, Socialdepartementet, Socialstyrelsen, Digitaliseringskommissionen, Kunskapscentrum för hälso och sjukvård, SKL etc

### Consulting
- The DOME project discusses with the consulting group.
- **Three organisations:** CeHis, VINNOVA, SKL e-beredningen

### Participatory
- Collaborates closely with the research group through focus groups, workshops, interviews and surveys
- **Twelve organisations:** Sveriges läkarförbund, Svenska läkaresällskapet, vårdförbundet, svenska läkaresekreterarförbundet, different patient organisations etc
Organisation of Reference groups

Healthcare – collaborating for better systems

Höstens workshop för DOMEs referensgrupper

Höstens referensgruppssmöte i DOME äger rum i samverkan med World Usability Day-eventet i Stockholm (worldusabilityday.org). I workshopen kommer vi att lyfta frågor kring patientens journal på nätet och andra patientrelaterade e-hälsojämnare. Syftet med workshopen är att ha en gemensam och interaktiv diskussion om aktuella frågeställningar som exempelvis: Skal man verkligen få ta emot cancerbesked över nätet?

Som inledning på dagen kommer vi att berätta om DOME-projektets resultat och SUSTAINS projektet kommer att ge en lägesrapport. Vi avrundar med en gemensam diskussion. Ta gärna med frågeställningar från den egna organisationen!

Torsdag 14 november kl. 09.30-15
Karolinska institutet i Solna,
Centrum för Hälsoinformatik
Widerströmska huset, Tomtebodavägen 18A

http://ki.se/content/1/c6/03/54/74/Welcome%20to%20HIC.pdf

Välkomna önskar DOME-projektet
Deployment of Online Medical records & Ehealth services
http://www.it.uu.se/research/hci/dome

Anmälaren den 8/11 2013
David Liljequist, Vårdföretaget
Malin Misaghi & Jonatan Wantzel, Usify, projektet Intygjämnare 2013
Maria Hägglund, Karolinska Institutet, projektet Mina vårdflöden
Isabella Scandurra, Uppsala Universitet, DOME-projektet

DOME-projektets kontaktpersoner för referensgrupper:
Isabella Scandurra, Uppsala Universitet
Gudbjörg Erlingsdottir, Lunds Universitet
Projektkoordinator:
Asa Cajander, Uppsala Universitet

Arrangörer:
World Usability Day

Hur mån våra eHälsosystem?

Ta tempen på hälso- och sjukvårdens IT-system tillsammans med:
David Liljequist, Vårdföretaget
Malin Misaghi & Jonatan Wantzel, Usify, projektet Intygjämnare 2013
Maria Hägglund, Karolinska Institutet, projektet Mina vårdflöden
Isabella Scandurra, Uppsala Universitet, DOME-projektet

14 november,
Kl. 15:00-18:00
Karolinska Institutet, hörsalen Andreas Vesalius
Berzelius väg 5, Solna

Läs mer och anmälan dig på www.wud.se

Evenementet är gratis, men observera att anmälningen är bindande.
# WP A: Patients and Relatives

<table>
<thead>
<tr>
<th>Effects on Patients and relatives</th>
<th>Use and benefits?</th>
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<tbody>
<tr>
<td>Attitudes and expectations regarding developed e-health services (pre-post deployment)</td>
<td>Impact on patients’ and relatives’ information behaviour</td>
</tr>
<tr>
<td>Other eHealth services (than Sustains) that are needed?</td>
<td>Impact on security, patient safety and privacy</td>
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<td></td>
<td>Visualization of information in the patient’s interface</td>
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<td>Availability for everyone? Users with specific requirements</td>
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</tbody>
</table>
1. Questionnaire study: Patients requiring their paper records (CESÅ1) (N 1000/354)
   Data collection ready – Ongoing analysis

2. Questionnaire study: patients with experiences of using an online EHR
   – Ture Ålanders’ practice (N 492/278)

3. Interview study: Patient empowerment and oncology patients (N 15 readers + 15 non)
   Ongoing data collection

4. 5. User satisfaction Survey and Patient Empowerment Survey (EPF)
<table>
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<tr>
<th>Effects on Professionals and Management</th>
<th>Profession in relation to other professions</th>
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<tbody>
<tr>
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<td>Profession in relation to patient</td>
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<td></td>
<td>Profession in relation to organization/management</td>
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<td></td>
<td>Relations between different care organizations</td>
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<td></td>
<td>How these factors change over time</td>
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<td>Which eHealth improvements do professionals desire in the future?</td>
</tr>
</tbody>
</table>
Studies in WP B: “Professionals and Management”

Surveys to care professionals
- Örebro
- Vårdförbundet
- Primary care physicians LUL

Management interviews at
- LUL
- Skåne
- VGR
- NLL

Media and the SUSTAINS project

Interviews with physicians
- LUL
- Skåne
- VGR
- NLL
To what extent were best-practice methods from Human-Computer Interaction used to provide user participation in the development process?

Does the eHealth system in focus contribute to lower costs?

How to develop a public eHealth services with focus on the patient and the professionals using the system and their respective needs?

What needs of future functionality can be found?

Which development and deployment methods can be used to ensure organizational needs as well as innovation?
Studies in WP C: “IT Dev & Deployment”

- Interview study with the SUSTAINS development organization in Uppsala
- National deployment

- Economic Indicators r/t eHealth services
- Privacy by Design
- Public authorities’ experiences of user participation
We know that

- Quality aspects in terms of usability, safety and operability are key success factors for eHealth services
- Many IT-projects do not have operational processes and procedures to achieve and ensure such quality aspects
- User participation in public eServices is challenging

We provided a constructive evaluation

- to get an improved insight in regular IT-development (and customer-vendor processes) and to deliver HCI knowledge to the actors

→ **Recommendations** to improve the development processes of public eHealth services (eGov services) to deliver higher quality to users

→ **Challenging** delimiting factors and

→ **New actions** for the research agenda
**eGOV initiative**: Today it is common for public authorities to develop e-services to residents with a primary objective to streamline their own operations (reduce cost & time to provide)

- "Build it and They will come"

Focus on citizens often receive little attention
→ e-services are not used
- - neither the authority nor citizen benefit from this

**Increasing interest in user participation for eGov services**

One way to increase the knowledge of citizens' needs is to allow citizens to participate in the development of e-services
→ to create e-services corresponding to the needs
- - entire society will benefit from this
Questions and comments?

Åsa Cajander | domecoordinator@it.uu.se
@isadurra  | Isabella.Scandurra@it.uu.se
http://www.it.uu.se/research/hci/dome
A selection of publications in 2013

- Gudbjörg Erlingsdottir och Cecilia Lindholm. "Because we can! Deployment of eHealth services in Uppsala County". NFF (nordisk föresgsekonomisk förening) konferens i Reykjavik i augusti 2013.
- ...