Seminar

User-Centred Systems Design in Practice

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Xian, Kunming, Beijing
User centred
Systems Design – in Practice

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The evolution that went wrong...
IT in Swedish working life

- 70% use IT daily
- 35% use IT minimum half the working day
- Within “office work” (25% of the total work force), 95% use computers, many of them 100% of the day
- Negative health consequences are constantly increasing!

Computer supported work....

- ...does not mean operating a computer,
- rather performing work, using a computer (= a tool),
- to support, rather than disturb,
- and that are not supposed to create new problems.
Health care work
Process and traffic control
Vehicles, ships

Controlling a high speed boat

Controlling a train
Administrative work  
(office, case handling)
User-centred Systems Design Defined
Lack of common definition of UCSD

- Usability engineering (Nielsen, Mayhew)
- Design for usability (IBM & Gould et al.)
- Human-centred design (ISO 13407)
- Scenario-based design (Carroll et al.)
- Goal-directed design (Cooper)
- Usage-centred design (Constantine & Lockwood)
- Contextual design – Customer-centred design (Beyer & Holtzblatt)
- Cooperative design (Scandinavian School) (Greenbaum & Kyng)
- Participatory design (Muller, Haslwanter & Day)
ISO 13407 – Human-centred design processes for interactive systems

1. Identify need for human-centred design
2. Understand & specify the context of use
3. Specify user & organisational requirements
4. Produce design solutions
5. System meets specified functional, user & organisational requirements
6. Evaluate designs against requirements
Definition of User-centred Systems Design

“User-centred systems design is a process focusing on usability throughout the entire development process and further throughout the system life cycle.”

Definition of Usability

"The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use."

ISO 9241-11 Guidance on usability
Principles for User-centred Systems Design
**Context of use**
- User focus
- Active user involvement

**Design**
- Simple representations
- Prototyping
- Explicit and conscious activities
- Holistic

**Systems development**
- Evolutionary
- Evaluate use in context
- Usability champion

**Attitude**
- Professional
- User-centred

**Results**
- Testable prototypes
- Usability goals
- Overall view of how the design will affect the organization

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Context of use – user focus

- **Who is the user?**
  Knowledge, interests, tasks and activities

- **What are his needs and goals?**
  Why and how do the user perform their tasks, how do they communicate, cooperate and interact

- **Where will the system be used?**
  At work, home, in the forest, during night time, under pressure, together with other people, alone, often or seldom...
Different contexts of use
Active user involvement

- Representative users
- Active participation
- Early and continuously

- Identify phases for user participation
- Meet the users in their context (workplace)

Note – differences between domain experts and real users

Results
Scenarios
User profiles
Personas
Awareness of user needs and context
Context of use – How would you design a phone list?

CAROL, I DON'T MEAN TO BE CRITICAL ABOUT THE DEPARTMENT PHONE LIST YOU PUT TOGETHER...

BUT IT'S TRADITIONAL TO LIST PEOPLE ALPHABETICALLY, NOT SORTED BY PHONE NUMBER.

BECAUSE WHAT POSSIBLE USE..?

INCOMING CALL FROM... LET'S SEE... IT'S WALLY... I CAN IGNORE IT.
Context of use – exercise

Build the context of use... who are we designing for?

- **Who is the user?**
  Knowledge, interests, tasks and activities

- **What are his needs and goals?**
  Why and how do the user perform their tasks, how do they communicate, cooperate and interact

- **Where will the system be used?**
  At work, home, in the forest, during night time, under pressure, together with other people, alone, often or seldom...
Design – use simple design representations

“The design must be represented in such ways that it can be easily understood by users and all other stakeholders.”
User Centred Systems Design

Design - prototyping

- User profiles, scenarios and other text-oriented requirements specifications are often too vague
  - Everyone who reads them get different views of the future use situation
  - Every design problem has at least 10 solutions, but only a few are good
  - Prototypes are concrete representations
Visualizing design solutions
Discuss: Should you use lofi or hifi prototypes when visualizing ideas?
Paper is understandable and inexpensive
The development process should contain dedicated design activities.

The user interface design and the interaction design are of undisputed importance for the success of the system. Far too often, the UI and interaction design “happens” as a result of somebody doing a bit of coding or modelling rather than being the result of professional interaction design as a structured and prioritized activity.
Holistic Design – getting the big picture

Organization

Work / Business

Technology

People / Competence

Results
- Testable prototypes
- Usability goals
- Overall view of how the design will affect the organization
Systems development - Evaluate use in context
Systems development - Evaluate use in context

- General designs solutions
- Crucial aspects/activities
- Overall use situations
Systems development - Evolutionary
Iterative

Analyze
requirements and user needs
- users, context and scenarios
- users’ needs, usability requirements and design goals

Feedback
plan the next iteration
- suggestion for changes
- project planning based on the outcome

Design for usability
by prototyping
- conceptual design
- interaction design
- detailed design

Evaluate
use in context
- evaluate early and continuously
- measure usability, business and effects

Results
Evaluated prototypes for construction
Systems development - Evolutionary

Incremental

System design

Increment 1
- Detailed design
- Coding
- Integration
- Deployment
- Production and maintenance

Increment 2
- Detailed design
- Coding
- Integration
- Deployment
- Production and maintenance

Increment n
- Detailed design
- Coding
- Integration
- Deployment
- Production and maintenance

System in production

Increment 1

Increment 2

Increment 3

Increment n
Systems development – Usability champion!

- Usability experts should be involved early and continuously

- Engine for the process from the beginning throughout the lifecycle

- Authority to decide on matters affecting the usability of the system and the future use situation
Systems development - Evolutionary

Analyze
requirements and user needs

Design for usability
by prototyping

Feedback
plan the next iteration

Evaluate
use in context

Iterative
Incremental
Usability champion

System in production
Increment 1
Increment 2
Increment 3
Increment n

Results
System in production which supports user needs and business goals
Attitude - professional

- The development process should be performed by effective **multidisciplinary teams**.

- Different aspects and parts of the system design and development process require different sets of skills and expertise.

- System architects, programmers, usability designers and interaction designers.
Attitude - Processes customization

- The UCSD process must be specified, adapted and/or implemented locally in each organization.
  - UCSD and usability cannot be achieved without a user-centred process. There is, however, no one-size-fits-all process.
  - Thus the actual contents of the UCSD process, the methods used, the order of activities, etc, must be customized and adapted to the particular organization and project based on their particular needs.
  - A UCSD process can be based on a commercial or in-house software development process, where activities are added, removed or modified. Existing methods and techniques may well be re-used, if they comply with the above factors/practices.
Attitude - user-centred

- A user-centred attitude should be established throughout the project team, the development organization and the client organization.
Definition of User-centred Systems Design

“User-centred systems design is a process focusing on usability throughout the entire development process and further throughout the system life cycle. It is based on the following key principles.”

User-centred Design – 12 principles

Context of use
User focus
Active user involvement

Design
Simple representations
Prototyping
Explicit and conscious activities
Holistic

Systems development
Evolutionary
Evaluate use in context
Usability champion

Attitude
Professional
User-centred
Processes customization

Results
Scenarios
User profiles
Personas
Awareness of user needs and context

Testable prototypes
Usability goals
Overall view of how the design will affect the organization
User-centred Systems Design is a process

**Vision and plan**
- initial concept
- business objectives and goals
- plan for UCSD

**Analyze requirements and user needs**
- users, users’ context and scenarios
- users’ needs, usability requirements and design goals

**Design for usability by prototyping**
- conceptual design
- interaction design
- detailed design

**Feedback plan the next iteration**
- suggestion for changes
- project planning based on the outcome

**Evaluate use in context**
- evaluate early and continuously
- measure usability, business and effects

**Construct and deploy**
- continuous focus on users and usability
- usability testing and monitoring
Discussion

Do you have a user-centred design process in your organization?

If no, why?

Which parts do you consider to be the most crucial parts, which parts are the most difficult to achieve?
What you can do

- **Communicate** why organizations did not meet their goals as regards usability

- **Include user-centred activities** and foster a common understanding among all stakeholders about the importance of usability

- **Develop** the processes and **customize** the organization

- **Teach** and **transfer knowledge** about UCSD,

- **Ensure** **active user participation**
What you can do

Comments from project managers:

"A user-centred approach will take too long and will increase timescales"
What you can do

Traditional Design Approach  User Centred Design Approach

Your answer:

"It is not about time its about allocating time differently, and usability should be seen as an investment not an expense"
What you can do

Vision and plan
- initial concept
- business objectives and goals
- plan for UCSD

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User involvement is central

In US 250 billion dollars is every year spent on 175 000 different IT-projects. 365 IT-companies with 8380 different IT-projects were analyzed in 1995.

- 31,1 % of the companies’ projects were cancelled.
- 52,7 % were performed with changed plans.
- 16,2 % were performed according to plan.

On average the costs for the changing plans increased with 189 %. 81 billion dollars is every year spent on projects that never leads to any results.

CHAOS report, Standish Group, 1995 (www.standishgroup.com)
Using the principles in practice - an example from an e-government project in Sweden
E-government in Sweden today

The goal of IT-policy is to make Sweden the first society to be an information society for all – the 24/7 agency...

- IT products and services should be accessible to and usable by everyone as far as this is at all possible
E-government in Sweden today

Based on the values of democracy the Swedish government aims to deliver public administration according to the following principles:

- All services which can be delivered electronically should be delivered electronically
- Accessibility, irrespective of office hours and location
- Different needs and conditions must be met so that no citizens are excluded from the new opportunities offered by e-government
- E-services must have a design and language that facilitate access for everyone
- High quality services and responses
- Openness to users’ opinions and ideas on how to improve public administration
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So is usability optimized in the governmental e-services? And are the services accessible for people with special needs, such as those with disabilities?

No…A study carried out in June 2003 showed that the vast majority of the public web sites were not structured or designed for the different abilities of people.
Development of national guidelines for design of public websites

2003, even though we had national guidelines for design of public websites, “the 24hour web version 1.0” many visitors were excluded from e-services and many authorities, county councils, municipalities hadn’t even started working on improving their websites...

We started by asking our users..

- Difficulties in interpreting and applying the accessibility guidelines – too technical
- Lack of knowledge, they didn’t know which parts to apply first
- Identified target groups; system architects, programmers, graphic designers, web publishers, editors, usability architects

We knew our users, target groups and we knew their wishes...
Development of national guidelines for design of public websites

Next step was to set up goals for the project...

- The target groups in the public administration should consider the “24 hour web” the primary knowledge base for development of websites
- Version 2.0 of the “24 hour web” should be more acknowledged and used than the previous version
- 80% of the target groups should know the existence of the “24 hour-web”
- The public websites should be more usable and accessible to as many visitors as possible, regardless of capabilities
Development of national guidelines for design of public websites

... and form the project team

- Two reference groups, user group and stakeholders
  - Continuous marketing and knowledge transfer with the organizations that were going to use the guidelines

- One multidisciplinary team (six people):
  - one systems architect,
  - one interface programmer,
  - two usability architects,
  - one accessibility expert,
  - one project manager with usability focus
Development of national guidelines for design of public websites

...which started the hard work

- Guidelines and chapters divided into separate sections according to the target groups
- Every section of the national guidelines was agreed upon by the whole project team
- Iterative and incremental development, different sections were developed continuously and
  - sent out to the users – 400 answers – input for redesign
- Continuous marketing and knowledge transfer with the organizations that were going to use the guidelines

The 24 hour web, version 2.0 was released in June 2004
Development of national guidelines for design of public websites

...what happened after the release in June 2004?

- A website with a discussion forum for user input was released
- 35 national seminars in Sweden
- More than 1000 copies sold
- 20 000 downloads of the document from the website
- The 24 hour web network increased the number of participants from 300 to 1000
- Increased awareness of these questions
- New version will be released in the beginning of 2006
- Spring 2006 - Certification of web sites based on the 24 hour web guidelines
Was it a user centred design process?

Analyze
requirements and user needs
by prototyping

Feedback
plan the next iteration

Evaluate
use in context
Was it a user centred design process?

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Thank you for listening!