Vorlesung
Mensch-Maschine-Interaktion

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Chapter 4
Analyzing the Requirements and Understanding the Design Space

- **3.1 Factors that Influence the User Interface**
- 3.2 Analyzing work processes and interaction
- 3.3 Conceptual Models – How the users see it
- 3.4 Analyzing existing systems
- 3.5 Describing the results of the Analysis
- 3.6 Understanding the Solution Space
- 3.7 Design Space for Input/Output
- 3.8 Technology Overview

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What is relevant?
What do we need to analyze?

- **Goals** of the project
- **People** involved in the operation of the system that is to be build
- **Processes** that are improved, changed, or replaced
- **Economic** constraints
- **Organizational** constraints and company/customer policies

→ Usually there is a trade-off between different factors

What do we need to Analyze?

- In the Analysis everything that has a potential impact on the solution should be accessed and investigated.

- Most importantly we have to look at
  - Users and their strength and limitations
  - Requirements imposed by the tasks that are to be supported
  - The available options for the implementation of a system (e.g. technologies)
  - The border conditions for development and deployment

Identifying the Goals of a development or project

- Why is a new software or system created?
- What is the main purpose?
  - Replace or improve on an existing system
  - Streamline operation and optimize work processes
  - Introduce a new process or a new option for a process
- In what context is this developed
  - during continued operation
  - In a restructuring phase
  - In a start-up phase of a company or operation
- What is the role of the software/system
  - Driver for restructuring
  - Only one issue within a set of changes made in the organization
- How important is the system to the customer
  - Mission critical, essential for sustaining business
  - Just a nice additional piece to have

Understanding the people involved

- Who are the people involved
  - Who are the decision makers
  - Who are the users
  - What relationship exists between users
  - What relationship exists between users and decision makers
  - What roles do users have (customer, administrator, controller, supervisor, …)
  - What tasks (in the real world and in the system) are preformed by the user
  - Why do people use a system and what is their motivation

- Remember Shneiderman's 1st principle: "Recognize User Diversity"

Organization constraints
Company policies

- How is the customer (e.g. company or organization) organized?
  - How are "chains of command"?
  - Who will decided in the end?
  - What is the relationship between the customer and the user?
- Can (potential) users be brought into the project?
- Is user centered design possible?
- Is clear information about the users available?
- Is the project secret?

Processes

- By introducing or changing software we affect processes in the real world, e.g.,
  - People will be able to do certain tasks they could not do before
  - Certain tasks will be automatically done without user involvement
  - Specific tasks will be speeded up and others may be slowed down
  - The quality of tasks and operations will be improved
  - **Certain processes become traceable and people can be made accountable**
  - Some operation will be made easier others will be more complicate

- Often related to rationalization of the workflow
- Change is not always welcome by everyone

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  - 3.2.2 Contextual enquiry
  - 3.2.3 Observational Studies and Video Analysis
  - 3.2.4 Task Analysis
  - 3.2.5 Object-Action-Interface Model
  - 3.2.6 Diary studies
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Economic constraints

- Only a certain budget is given
- Only a certain time for the introduction / change is available

- Objective: a product that is desirable and viable and buildable
  - What do people desire?
  - What will sustain a business?
  - What can be build?

- Software development and the creation of the user interface is one piece in a complex development!

Methods for Analysis

- Methods for analysis can also be used in different phases of a project
  - During analysis to establish requirements
  - During design to decide on alternatives
  - During prototyping to assess different solutions
  - After Implementation to test if the requirements are met
  - In operation to improve the product and to create ideas for the next version
- The methods are often appropriated/tailored to fit a certain development, e.g.
  - How many users to involve
  - Where to carry out the interview
- Similar to other fields, e.g. market research

Chapter 4
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Focus Group – Basics

Foto from http://www.focusgroupdimensions.com

- Informal group gathering
  - 6 to 12 people
  - Focus on a specific topic
  - Group discussion as means of communication
- Gather qualitative date from a group of people
- Get indication how people think and feel
- Collecting **opinions, attitudes, feelings, perceptions, and ideas**
- Get examples and rich descriptions
- Understand why people act or react in a certain way
- Can be used in different project phases, not suitable for formal evaluation

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Creating a Focus Group

- Selecting people for a focus group
  - Balance between similarity and productive heterogeneity
  - Usually not representative
  - In general do not mix people that are at different levels in company hierarchy
  - In general do not mix people that have very opposite views
  - Do not set up a group where everyone has the same views
  - Diversity is useful
  - Too small groups do not generate a discussion, too large groups make it hard to involve all participants
- Consider having different focus groups to get information from different angles
  - One group with men and one with women
  - One with managers and one with sales staff
- Expected group dynamics and behavior should allow a constructive discussion

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Planning a Focus Group Discussion

- Organize a appropriate location and time slot (1-2 hours)
- Prepare a set of open ended questions and discussion points (4 to 10 questions)
- Set questions that to allow group dynamics and spontaneity
- Focus groups can take place once or can be run as a program of focus group sessions
- Invite participants individually and explain the concept of the focus group and its purpose
- Prepare material that makes the discussion more tangible (e.g. product prototypes, concept video)
- Prepare for recording the session

Running a Focus Group Session

- Moderator keeps the group focused and the discussion moving
- Start with an introduction and provide name tags to participants
- Explain the rules of the discussion (e.g. confidentiality)
- Start with simple non-controversial questions
- Pose open-ended questions
- Avoid question that lead to specific answers
- Allow for diverse opinions and for equal opportunities in the discussion
- Encourage each participant to express their own point of view
- Consensus between participants is not required
- Capture or record the session (video, audio, note taking)

Pros and Cons of Focus Groups

- Advantages
  - Wide range of information
  - In-depth information (Why user …)
  - Possibility to explore related topics or go into more detail
  - Cheap and easy to do
- Disadvantages
  - Sampling of participants is not random nor representative
  - The moderator plays a significant role and can influence the results
  - No quantitative information can be gathered
  - Findings can not be easily generalized

When to use Focus Groups?

- Generating ideas for a new product or a product improvement
- Comparison of two or more candidate designs for a product
- Explore and generate a hypotheses for a following study

- http://www.soc.surrey.ac.uk/sru/SRU19.html
- http://www.bren.ucsb.edu/academics/courses/281/Readings/whatar efocusgroups.pdf
- http://www.useit.com/papers/focusgroups.html
- http://www.usabilitynet.org/tools/focusgroups.htm
- http://www.humanfactors.com/downloads/sep04.asp

Contextual Enquiry

- Investigating and understanding the users and their environment, tasks, issues, and preferences
- Analyzing users' needs
- Related to task analysis
- Done by visits in context
- Observing and interviewing users in their environment while they do their work

- Further Information:
  http://www.infodesign.com.au/usabilityresources/analysis/contextualenquiry.asp
  http://www.infodesign.com.au/usabilityresources/analysis/userprofileforms.asp
  http://www.sitepoint.com/article/contextual-enquiry-primer

Focus Groups – Discussion

- Should focus groups be used?
- What focus groups would be appropriate?
- What are the requirements for the moderator?

- Image you have the following project to do…
  - Football championship web page for mobile device access (reporting of the daily results)
  - Micro-payment service on the website of Bravo-TV
  - Information web site on social benefits of the city council of Munich
  - Introduction of advertising on the university main website
  - Age verification (e.g. over 18) on web sites
  - Pay-per-view provision of adult content on mobile devices
  - Streaming video (e.g. selected TV shows) on a mobile Phone

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4

## Ethnographic Observation in HCI Contextual Enquires

- Learning about the way user's work in the users workplace
- Understanding the work practices and why certain tasks are performed
- Master – apprentice relationship
  - User (master) teaches the observer (apprentice) what they do and how they do it
  - master explains while working
  - Validate your observation by re-phrasing and discuss interpretations made
  - apprentice asks whenever it is not clear
- This method allows to understand how people work and **why** it is done in a certain way
- The observer must be prepared before the interview (understand the language)
- Limit the time of contextual interviews

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Ethnographic Observation in HCI Interviews

- Prepare a set of questions beforehand (e.g. what do you want to know from the user)
- Tell people what are you doing
- Use capture (audio/video) if your communication partners agree
- If applicable capture (take photos/video) material they use in their work (e.g. a manual, a checklist, the post-its around the screen)
- Be nosy … ask for details
- If possible summaries what your interview partner told you (to minimize misunderstandings)
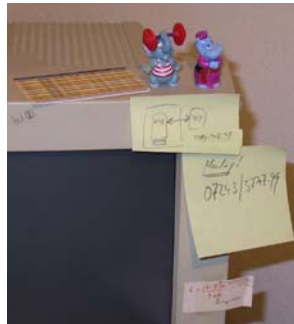
What and when to observe

From chapter 12
www.id-book.com

- Goals & questions determine the paradigms and techniques used.
- Observation is valuable any time during design.
- Quick & dirty observations early in design
- Observation can be done in the field (i.e., field studies) and in controlled environments (i.e., usability studies)
- Observers can be:
  - outsiders looking on
  - participants, i.e., participant observers
  - ethnographers

Collecting Ideas from People in the context of their everyday life

- Cultural Probes
- Package of materials, e.g.
  - Postcards
  - Disposable camera
  - Maps
  - Photo Album
  - Media diary
- Instructions for actions to be taken
- To provoke (contextual) inspirational responses from the users
- Over a period of time
- User centered inspiration

Gaver, W., Dunne, T., Pacenti, E.: Design. Cultural probes, Interactions, 6(1), 1999

Frameworks to guide observation

From chapter 12
www.id-book.com

- *The person.* Who?
  - *The place.* Where?
  - *The thing.* What?

- The Goetz and LeCompte (1984) framework:
  - *Who* is present?
  - What is their role?
  - *What* is happening?
  - *When* does the activity occur?
  - *Where* is it happening?
  - *Why* is it happening?
  - *How* is the activity organized?

You need to consider

- Goals & questions
- Which framework & techniques
- How to collect data
- Which equipment to use
- How to gain acceptance
- How to handle sensitive issues
- Whether and how to involve informants
- How to analyze the data
- Whether to triangulate

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Slide 31

Data collection techniques

- Notes & still camera
- Audio & still camera
- Video
- Tracking users:
  - diaries
  - interaction logging

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Slide 32

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Slide 33