

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 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

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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



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 performed by the user
 - Why do people use a system and what is their motivation

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

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

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!



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?



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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



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Focus Group – Basics

- Informal group gathering
 - 6 to 12 people
 - Focus on a specific topic
 - Group discussion as means of communication
- Gather qualitative data 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



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



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/whatarfocusgroups.pdf>
- <http://www.useit.com/papers/focusgroups.html>
- <http://www.usabilitynet.org/tools/focusgroups.htm>
- <http://www.humanfactors.com/downloads/sep04.asp>



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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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>





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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



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)



Collecting Ideas from People in the context of their everyday life



Figure 1. A cultural probe package.

- 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



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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

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

From chapter 12
www.id-book.com

- 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



Data collection techniques

From chapter 12
www.id-book.com

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

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<http://www.bren.ucsb.edu/academics/courses/281/Readings/whatarefocusgroups.pdf>