Interaction Design

Chapter 5 (May 13, 2015, 9am-12pm):
Applying Interaction Design I
Recap Session Day 3+4:
Expert Mindset
“users” seen as subjects (reactive informers)

Participatory Mindset
“users” seen as partners (active co-creators)

Design-Led
- design-led with expert mindset
- design-led with participatory mindset

Research-Led
- research-led with expert mindset
- research-led with participatory mindset

source: [6+7]
<table>
<thead>
<tr>
<th>Approach</th>
<th>Overview</th>
<th>Users</th>
<th>Designer</th>
</tr>
</thead>
<tbody>
<tr>
<td>User-Centered Design</td>
<td>Focuses on user needs and goals</td>
<td>Guide the design</td>
<td>Translates user needs and goals</td>
</tr>
<tr>
<td>Activity-Centered Design</td>
<td>Focuses on the tasks and activities that need to be accomplished</td>
<td>Perform the activities</td>
<td>Creates tools for actions</td>
</tr>
<tr>
<td>Systems Design</td>
<td>Focuses on the components of a system</td>
<td>Set the goals of the system</td>
<td>Makes sure all the parts of the system are in place</td>
</tr>
<tr>
<td>Genius Design</td>
<td>Relies on the skill and wisdom of designers used to make products</td>
<td>Source of validation</td>
<td>Is the source of inspiration</td>
</tr>
</tbody>
</table>
Four basic activities

• Identifying needs and establishing requirements
• Developing alternative designs
• Building interactive versions of the designs
• Evaluating designs

source: [4]
Summary:

• **Goals** are important in UCD -> interaction designer focus on what the user ultimately wants to accomplish.

• Interaction designer determines the user’s task and means necessary to achieve those goals -> always with the users needs and preferences in mind

• Interaction designers involve users at every stage of the process

• Users are consulted of the very beginning of a new project

• Interaction designers conduct extensive research (Chapter 4) up front to determine what the users goals are in the current situation

• Interaction Designers test and try prototypes of a system with users

• **User data is a determining factor throughout the project when making decisions**

source: [5]
Why is sketching useful?

- Early ideation
- Think through ideas
- Force you to visualize how things come together
- Communicate ideas to others to inspire new designs
- Active brainstorming
Clear vocabulary
Plentiful
Suggest and explore rather than confirm
Quick and inexpensive
Timely, when needed
Disposable
Minimal detail and distinct gesture
Ambiguous
Appropriate degree of refinement
Applying Interaction Design

- What is Design Research?
- Conducting Design Research
- HCI-related and practical information for your own studies
- Interpretation of Data and Presentation of Results
Designers not only tell a story, they listen to one...

Bill Buxton
People

source: [8]
In design research we are driven by a need for a deeper understanding

Susan Dray - Dray & Associates, Inc., USA
infrequent users

novice users

frequent users

expert users

infrequent users
BMW 3 Series Cockpit

image source © BMW
BMW Racing Cockpit

image source © BMW
Different user types and usage frequency will require dedicated solutions.
It is essential to the success of interaction design that designers find a way to understand the perceptions, circumstances, habits, needs, and desires of the ultimate users.

Jane Fulton Suri, 2005
Statistical
Macro techniques
(many people)

SURVEYS

VIDEO ETHNOGRAPHY

Focus Groups
Explicit opportunities and needs

Latent opportunities and needs

Observational Techniques
Micro techniques
(few people)
Interpretive

Saying

source: [8]
The diagram illustrates various methods for understanding user needs and behaviors. It categorizes techniques based on whether they focus on explicit or latent opportunities and needs. On the left side aremacro techniques (many people) and on the right side are micro techniques (few people). The top row focuses on statistical methods, while the bottom row focuses on observational methods.

- **Saying (Explicit opportunities and needs):**
  - **Statistical**
    - Surveys
  - **Observational Techniques**
    - Focus Groups

- **Doing (Latent opportunities and needs):**
  - **Statistical**
    - Video Ethnography
  - **Observational Techniques**

The source of this diagram is [8].
ANALYSIS
Definition of the system
What is the problem?

EVALUATION
Possible alternatives
What future do we want?

SYNTHESIS
Design of final solutions
What do we implement?

The designer is a ‘problem-scouter’

The designer is a ‘story-teller’

The designer is an ‘executor’

source: [4]
<table>
<thead>
<tr>
<th>subjects</th>
<th>truth</th>
<th>inspiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>traditional market research</td>
<td></td>
<td>(?)</td>
</tr>
<tr>
<td>empathic research</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Why Design Research?

(a) **Instrument of knowledge.** Any time we design for a specific domain we need to learn how things work in this domain. One way of doing it is to review existing literature and previous work (desk research). Another way, complementary to desk research, is to go to the field and look directly for the information we need.

(b) **Support for thinking.** User research tools are not formulas, but they help to overcome the subjective view of the designer.

(c) **Instrument to communicate and legitimate.** Everything we learn from user research has the great advantage of being “true” (although not in an absolute way), because it comes from the real world and from real experiences.

source: [4]
Design Research’ Roots

The importance of design with user needs in mind is not new. Since design has roots in craft, customised solutions by craftsman can be considered the first user-centred design.

Many methods employed in design research have their roots in cultural anthropology, social behavioural sciences and psychology (for example: experiments, questionnaires, interviews, observation), some have been adapted from marketing disciplines (e.g. focus group, workshops, telephone survey), while others have been developed specifically for user research and usability evaluation (e.g. cognitive walkthroughs, logging).

source: [4]
Applying Interaction Design

• What is Design Research?

• Conducting Design Research

• HCI-related and practical information for your own studies

• Interpretation of Data and Presentation of Results
Design Research is mostly structured:

1. Key Research Planning
2. Do Field Research
3. Find Opportunity Spaces

source: [10]
IDEO Method Cards
Fly on the Wall

How
Observe and record behaviour within its context, without interfering with people’s activities.

Why
It is useful to see what people do in real contexts and time frames, rather than accept what they say they did after the fact.

Example
By spending time in the operating room, the designers were able to observe and understand the information that the surgical team needed.

source: [7]
MMI | HMI | Individual embedded design and HMI products

for touch panels, tablets, control panels and communication solutions

Learn more

Produkte | partner to renowned technology suppliers

Learn more
A Day in the Life

How
Catalog the activities and contexts that users experience for an entire day.

Why
This is a useful way to reveal unanticipated issues inherent in the routines and circumstances people experience daily.

Example
For the design of a portable communication device, the design team followed people throughout the day, observing moments at which they would like to be able to access information.

source: [7]
Shadowing

How
Tag along with people to observe and understand their day-to-day routines, interactions, and contexts.

Why
This is a valuable way to reveal design opportunities and show how a product might affect or complement user’s behavior.

Example
The team accompanied truckers on their routes in order to understand how they might be affected by a device capable of detecting drowsiness.

source: [7]
Personal Inventory

**How**
Document the things that people identify as important to them as a way of cataloging evidence of their lifestyles.

**Why**
This method is useful for revealing people’s activities, perceptions, and values as well as patterns among them.

**Example**
For a project to design a handheld electronic device, people were asked to show the contents of their purses and briefcases and explain how they use the objects that they carry around everyday.

source: [7]
Summary Observation

• Direct observation in the field
  – Structuring frameworks
  – Degree of participation (insider or outsider)
  – Ethnography

• Indirect observation: tracking users’ activities
  – Diaries
  – Interaction logging

source: [8]
Interviews in the “Wild”
Interviews in the “Wild”
Interviews in the “Wild”
Interviews in the “Wild”
Interviews in the “Wild”
Ethnography

- Ethnography is a philosophy with a set of techniques that include participant observation and interviews
- Debate about differences between participant observation and ethnography
- Ethnographers immerse themselves in the culture that they study
- A researcher’s degree of participation can vary along a scale from ‘outside’ to ‘inside’
- Analyzing video and data logs can be time-consuming
- Collections of comments, incidents, and artifacts are made
Applying Interaction Design I

- What is Design Research?
- Conducting Design Research
- HCI-related and practical information for your own studies
- Interpretation of Data and Presentation of Results
Four key issues

• Setting goals
  – Decide how to analyse data once collected

• Relationship with participants
  – Clear and professional
  – Informed consent when appropriate

• Triangulation
  – Use more than one approach

• Pilot studies
  – Small trial of main study

source: [2]
Data recording

- Notes, audio, video, photographs
- Notes plus photographs
- Audio plus photographs
- Video

source: [8]
Tools of Trade:
Interviews

**Unstructured** - are not directed by a script. Rich but not replicable.

**Structured** - are tightly scripted, often like a questionnaire. Replicable but may lack richness.

**Semi-structured** - guided by a script but interesting issues can be explored in more depth. Can provide a good balance between richness and replicability.

source: [8]
Interview questions

Two types:
‘closed questions’ have a predetermined answer format, e.g., ‘yes’ or ‘no’
‘open questions’ do not have a predetermined format
Closed questions are easier to analyse

Avoid:
Long questions
Compound sentences - split them into two
Jargon and language that the interviewee may not understand
Leading questions that make assumptions e.g., why do you like …?
Unconscious biases e.g., gender stereotypes

source: [8]
Running the interview

- **Introduction** – introduce yourself, explain the goals of the interview, reassure about the ethical issues, ask to record, present any informed consent form.

- **Warm-up** – make first questions easy and non-threatening.

- **Main body** – present questions in a logical order

- **A cool-off period** – include a few easy questions to defuse tension at the end

- **Closure** – thank interviewee, signal the end, e.g., switch recorder off.

source: [8]
Enriching the interview process

Props - devices for prompting interviewee, e.g., a prototype, scenario

source: [8]
Artefacts or props can play a significant role in the process by
(1) staying focused and structured on the topic and
(2) making a complex technology or system explainable within a short
timeframe (sketch, props, 3D artefacts)
Low Fidelity Artefacts
Low Fidelity Artefacts
Low Fidelity Artefacts
Schildern Sie kurz ihr Erlebnis, waren Sie
furchtbar. (würde nicht gesch"o
acht bereit Display sich)
fach/schwierig ist die Benutzbarh
kug braucht man nicht
What is it we are trying to understand?

• set **Goals**!

...and write a **short abstract**
(helps to stay focused and ask precise questions directly addressed to the goals of the study)
Advice on Questions to Ask:

• **finding Cause(s)**: What is causing the problem?

• **finding Solution(s)**: Ideas on how to solve a problem or initiate a business opportunity

• ask questions on **only one dimension**!
  (e.g., “Were you satisfied with the quality of our food and service?” (counter example))

source: [10]
Questionnaires

- Questions can be **closed or open**

- Closed questions are **easier to analyse**, and may be done by computer

- Can be administered to large populations

- Paper, email and the web used for dissemination

- Sampling can be a problem when the size of a population is unknown as is common online

source: [8]
Questionnaire design

• The impact of a question can be influenced by question order.

• Do you need different versions of the questionnaire for different populations?

• Provide clear instructions on how to complete the questionnaire.

• Strike a balance between using white space and keeping the questionnaire compact.

• Decide on whether phrases will all be positive, all negative or mixed.

source: [8]
Question and response format

- ‘Yes’ and ‘No’ checkboxes
- Checkboxes that offer many options
- Rating scales
- Likert scales
- Semantic scales
- 3, 5, 7 or more points?
- Open-ended responses

source: [8]
Questionnaires should accommodate all possible answers:

e.g., consider the question:

What brand of computer do you own?
A. IBM PC
B. Apple

What’s the issue here?
Questionnaires should accommodate all possible answers:

* e.g., consider the question:

**What brand of computer do you own?**

A. IBM PC
B. Apple

**What’s the issue here?**

- Do not own a computer
- IBM PC
- Apple
- Other

source: [10]
Summary Creating a Good Questionnaire:

• Keep your questionnaire **short**. In fact, the shorter the better.

• Use **simple and direct language**. The questions must be clearly understood by the respondent.

• Begin with a few **non-threatening** and interesting items.

• Place the **most important items in the first half** of the questionnaire

• Leave **adequate space** for respondents to make comments.

• Perform **iterative pre-tests** and eliminate or replace questions that are hard to understand or lead to useless / unsatisfying results.

• Accommodate **all answers**
Encouraging a good response

- Make sure purpose of study is clear
- Promise anonymity
- Ensure questionnaire is well designed
- Offer a short version for those who do not have time to complete a long questionnaire
- If mailed, include a stamped addressed envelope
- Follow-up with emails, phone calls, letters
- Provide an incentive
- 40% response rate is high, 20% is often acceptable

source: [8]
Structuring frameworks to guide observation

• 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?
Choosing and combining techniques

- Depends on
  - The **focus** of the study
  - The **participants** involved
  - The **nature** of the technique
  - The **resources** available

source: [8]
Scheduling and Time Planning

(1) Goal clarification
(2) Overall study design
(3) Selecting the Sample
(4) Designing the Questionnaire
(5) Conduct Pilot Test
(6) Revise Questionnaire
(7) Printing Time
(8) Locating the sample
(9) Mail & Response Time
(10) Attempts to get non-responders
(11) Editing Data
(13) Analyzing Data
(14) Preparing Report
(15) Printing and distribution

source: [10]
Summary

- Three main data gathering methods: interviews, questionnaires, observation
- Four key issues of data gathering: goals, triangulation, participant relationship, pilot
- Interviews may be structured, semi-structured or unstructured
- Observation may be direct or indirect, in the field or in controlled setting
- Techniques can be combined depending on study focus, participants, nature of technique and available resources

source: [8]
Affinity Diagram

- A method for sorting and making sense out of data to identify themes and discover unseen connections
- Data points can be recorded on sticky notes and sorted into logical groups/themes
Affinity Diagram

- Brainstorm or use the recoded research data to identify ideas, aspects and issues
- Record each finding on cards or post-it notes
- Look for related concepts
- Sort notes or cards into groups until all cards have been used
- Repeat as many times as needed
- Add labels to themes if appropriate
- Draw connections between findings and themes
References: