Advanced Design of Interactive Systems

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**Design Brief**

- Identify key problems with an existing system, using: introspection, observation, interviews, questionnaires
- Design and run a participatory design workshop with users to explore new ideas
- Create a novel, principled design that takes advantage of generative design principles, including *(at least)* instrumental interaction and co-adaptation
- Create a video prototype video to illustrate the design

**Topic:**

Help users find, use, create, ... 
- local sports facilities
- housing options
- local eating & shopping
- cultural activities
- Paris-Saclay admin

Look for real problems ... how can you make it better?

Informed consent
Informed consent

<table>
<thead>
<tr>
<th>Purpose: What is the study for?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedures: What will they do and for how long?</td>
</tr>
<tr>
<td>Risks: Should be 'none'</td>
</tr>
<tr>
<td>Benefits: Who benefits and how?</td>
</tr>
<tr>
<td>Anonymity: How will their identity be kept secret?</td>
</tr>
<tr>
<td>Compensation: Often voluntary and unpaid</td>
</tr>
<tr>
<td>Withdrawal: User may withdraw at any time without a reason</td>
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<tr>
<td>Approval: If it has undergone IRB review</td>
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Common sense when discussing user results

- Protect people’s privacy
  - Don’t put their data out on the web
  - Don’t make people look foolish
- No Youtube videos
- Educate the audience
  - Tell them how to view errors
- Summarize results fairly
  - Don’t over-emphasize your favorite issue
  - Don’t change the intended use
- No post-hoc marketing

Ethics … from different perspectives

Each profession has rules to protect someone … but not always the same person.

<table>
<thead>
<tr>
<th>Scientists</th>
<th>protect</th>
<th>users / subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journalists</td>
<td>public</td>
<td></td>
</tr>
<tr>
<td>Consultants</td>
<td>clients</td>
<td></td>
</tr>
<tr>
<td>Corporations</td>
<td>corporation</td>
<td></td>
</tr>
</tbody>
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Institutional Review Board (IRB) designed to protect participants in experiments

- Primarily in medical studies, but also when using technology

IRB

Institutional Review Board

Mandated by the government
Milgram’s ‘Obedience to Authority’ experiment

Will ordinary people give a stranger a lethal electric shock in the name of science?
“Teachers” administer shocks to “students”
Start with a sample 45v shock
Paired-associate learning task

Does a project need an IRB review?

“Human subjects” are users or participants

Diary study

Diary studies

Ask users to keep a diary as they use the system to keep track of problems, successes, comments and suggestions
Logging study

Why do people abandon windows on their screens?
From reminders to forgotten windows

Logging study - WM Lisa

What is the lifetime of a window on the screen?
Log state of every window over two weeks
Critical incident-style pop-up questions

maximum 58 sessions
75% quartile 8 sessions
median 3 sessions
25% quartile 1 session
minimum 1 session

Logging study - upgrades

How do people react to system upgrades?
Log user’s reactions over four weeks
Daily critical incident-style pop-up questions

Participant P1 P2 P3 P4 P5 P6 P7 P9 P10 P11 P12 P13 P14
Valence Neutral 4 3 3 1 1 1 1 1 1 1 1 4 4 4 Positive 1 1 1 1 1 1 1 1 1 1 1 1
Count of change valence

Figure 2. Popping windows per session increases with sessions between weeks.

Inria & Université Paris-Saclay
Logging study - upgrades

Delays get longer over time:

Fewer positive reactions:

Field experiments

Dan Russell (Google) creates huge controlled field experiments with a million subjects per condition

Example:
Does the background color affect likelihood of buying?
(Yes! 20% more with certain colors)

Obama’s campaign:
Send different ads to randomly selected people
Follow up calls: Which work best and on whom?

Discovered Republican women who were affected by national healthcare proposal

Controlled field study: PageLinker

Contextual bookmarks
Field experiment: PageLinker

4-week field experiment: ABAB within-subjects design
Scenarios with 5 search tasks:
- Perform task 1, then 2 or 3, then 4 when tasks 1–3 complete.
- Task 5 is independent of tasks 1–4.

Class exercises

Peer introspection exercise

Interview a colleague from the other topic:
What was the last [travel challenge] you experienced?
What software did you use?
Were you able to reuse anything from a previous trip?
If possible, demonstrate using the system.
What problems did you experience?
Take notes!

Interviewers:
- Describe what happened,
- emphasize problems and surprises
- Summarize the key opportunities for design

Interviewees:
- Identify the three* most important problems
- Mail them to your interviewer

* You may add more if you like

Comments

Do not look for solutions yet …
Focus on identifying 3-5 key problems
Focus on the actual problem from the user’s perspective
not the tool or the platform

“Good” problems:
- Frustrate users
- Occur across platforms

Questionnaires

Interviews vs. questionnaires

The same question types work for both
but the goals are different
and the analysis is different

Advantages of interviews:
- easier to get in-context information
- easier to get real-world stories
- easier to probe deeply into an interesting situation

Advantages of questionnaires:
- can ask lots of people
- simple questions are easy to tabulate
- often used for opinions
**Interviews vs. questionnaires**

**Interviews**
- Few answers
- Can delve deeper to find out more
- Analyze by hand

**Questionnaires**
- Many answers
- Difficult to ask follow-on questions
- Automated analysis possible

**Questionnaires**
- Goal: Obtain data from a large number of users
- Careful:
  - Users are less likely to respond honestly
  - Questions may not really address the questions you think they are (external validity problem)

**Design a questionnaire**

- What information are you seeking?
  - Ask only what is necessary
  - Frame the questions correctly
- Who is the audience?
  - 50 - 1000 users … or more?
  - How many years have you used this email system?
- How will you send your survey?
  - Most often with a survey web app
  - But sometimes paper is better
- How will you analyze your results?
  - Consider the statistical analysis first

**Question styles**

- **Background**
  - Age, profession, years in the job
- **General information**
  - How many years have you used this email system?
- **Directed questions**
  - How many messages did you receive yesterday?
- **Multiple choice**
  - I move messages to project folders
    - o never     o rarely     o often     o always
### Question styles

<table>
<thead>
<tr>
<th>Scalaire</th>
<th>I can easily manage my email</th>
</tr>
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<tbody>
<tr>
<td>Strongly</td>
<td>Strongly</td>
</tr>
<tr>
<td>Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>-2</td>
<td>-1</td>
</tr>
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</table>

#### Ranking

Rank the following functions in order of usefulness

- Blind copy
- Automatic copy to a distribution list
- Automatique to myself

#### Open questions

Describe how you use electronic mail.

### One more reminder

#### Directed, specific questions

- are easiest to code
- belong at the beginning of the questionnaire
- provide the fewest interesting results

#### Open, general questions

- are very difficult to code and analyze
- may provide very interesting responses
- but also risk giving stereotypical responses

### Principles for designing questions

#### Use parallel structure for sentences

#### Keep the order coherent, e.g. positive to negative

#### Zero can mean two things:

- neutral, middle response
- "I do not know"

#### Consider adding a degree of confidence

#### Avoid asking 'obvious' questions

#### Ask the same question in two different ways to see if you get the same result

### Design vs. Marketing questionnaires

#### Designers need facts to inform the design

- examples of problems, stories about events,
- data about use

#### Marketing wants opinions

- what people like and do not like,
- what they think they want

#### Emphasize facts first, then opinions

- Directed questions (specific or open-ended) often elicit facts
- General questions (specific or open-ended) often lead to opinions
Participatory Design

Participatory Design focuses on situated interaction between users and technology.

Participatory Design involves users throughout the design process.

Participatory Design is fundamentally generative, not evaluative.

Participatory Design values iteration and rapid redesign.

Participatory Design explores breakdowns and the unexpected, not just perfection.

Participatory design is an iterative process...

Design activities build upon previously created design resources.

Iterative design means redesign.

Within an iterative design process, redesign is more important than initial design.

Do not just "do it again!" reflect on your designs in context.
Perspectives on understanding users

Scientific view
- Collect data about users
- ‘Objective’ analysis
- Inform designers

Design perspective
- Seek design inspiration
- Redefine the design problem
- Generate innovations

Engineering perspective
- Address a given problem
- Make technical trade-offs
- Ensure that it works “in situ”

Participatory Design

Participatory Design

Techniques include regular and video brainstorming, developing scenarios, paper prototyping and video prototyping
Why participatory design?

Asking users ≠ letting them show you

It is hard to figure out what the user experiences…
  especially if you are not one of your own users.

Your instincts are not enough and often wrong
  … and get worse as you delve deeper into the design.

You will understand the system more
  … but the user less.

Examples:

General Motors executives thought GM quality was great.
  Every morning, their cars went to the shop
  Experts tuned them, cars rarely broke down

BUT GM customers had a very different experience
  No daily tune-ups – poor reliability

Executives had no clue about what was wrong

Examples:

California Department of Motor Vehicles was very, very slow
  Executives skipped the lines
  All other drivers forced to wait with regular customers

Innovation: New DMV head made everyone wait in same lines
  Result: Many innovations and reduced lines

Your design instincts are not good
  if you do not have the same experience

Create environments where users expose their real experiences
  and you gain design intuitions about them
**Homework**

### For Monday:

Each group should have:
- questionnaire results
  - 5 questions per group questionnaire
  - 30 responses (if each person sends to 10 friends)
- 3-4 peer introspections from class
- 6-8 interview stories

Choose your topic today, come prepared with design ideas on Monday

### On Monday:

Based on your user information:
- identify the user profile and 3 personas (1 extreme)
- create a user scenario with 8-10 interaction points
- design concept (first draft)