Course structure

Lectures (in class)
- Present fundamentals & principles from different disciplines
- Relate design activities to each other and as a whole

Design activities (in class or at home)
- Individual and group
  - Each builds upon previous results!! (you cannot skip any)

Project (in class and at home)
- Groups of 3-4
- Goal: produce a grounded video prototype

Course Schedule

Weeks 1-4
- First complete design cycle
- Midterm: grounded video prototype
- Christmas Break

Weeks 5-8
- Generative deconstruction
- Principled techniques for redesign
- Co-adaptive instruments

Week 9
- Final presentation
Course project
You will create a video prototype of an original design of an interactive system that meets the needs of real users in a real setting.

Projects involve in-class exercises and homework attendance is critical!

Most projects involve groups of 3-4 some activities are individual, others are in groups you may choose your own project or one of ours.

Project possibilities
Discovering information about the Plateau de Saclay app or web site
Getting to and around CHI’13 app or website
Your own project …
Research?
Startup idea?

Decide by next week … 4 December 2012

Grading
Participation
Class exercises
Homework exercises

Final Presentation
with Video Prototype

Final Report
Executive Summary

Note: Different masters have different requirements, so I will adjust accordingly

Mid-term video prototype due: 8 January
Executive summary (5 pages max) to describe the design
- Who is the audience?
- What is the design concept?
- Which design resources did you use?
- Initial scenario

Storyboard

Video prototype (5-7 minutes)
### Final presentation

- **Oral presentation**
  - 15 minutes:
    - design problem
    - user profile
    - design alternatives considered and rejected
    - final design
    - video prototype (maximum 5 minutes)
    - justification
  - 5 minutes:
    - class discussion: every group asks at least one question

Also due: video prototype, transparencies, final storyboard

### Final report

- **Executive summary of your project**
  - 10 pages maximum

- Potential users:
  - who are they? (refer to your data)
  - what do they need?

- Design concept:
  - what is the design concept?
  - what alternatives were considered?
  - why is this a good solution? (avoid marketing!)

### Generative Design

<table>
<thead>
<tr>
<th>Discovery</th>
<th>Invention</th>
<th>Design</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who is the user?</td>
<td>What is possible?</td>
<td>What should it be?</td>
<td>Does it work?</td>
</tr>
</tbody>
</table>

### Designing interactive systems

- Researchers & Designers
Participatory Design

- focuses on **situated interaction** between users and technology
- involves **users throughout** the design process
- is fundamentally **generative**, not evaluative
- values iteration and rapid **redesign**
- explores **breakdowns** and the unexpected not just perfection

Design should be an iterative participatory process . . .

Design activities produce resources for design

If you create design resources, use them to help you design!
Generative Design

Discovery
Who is the user?
Invention
What is possible?
Design
What should it be?
Evaluation: Does it work?

Four phases
Each phase contributes to the other phases:

- The process is iterative
- Jump from any phase to any other phase as needed

Multi-Disciplinary Design Methods

- Understand the user
- Analyse the user
- Invent new ideas
- Prototype the system
- Evaluate the system
- Redesign the system

- Ethnographic observation
- Interactive Thread
- Oral brainstorming
- Paper prototyping
- Focus group
- Generative walkthrough

- Clifford Atkinson
- Contextual Inquiry
- Design Space
- Video prototyping
- Usability study
- Technology probe

- Qualitative
- Think aloud
- Data analysis
- Storytelling
- Wizard of Oz
- Design critique
- Design critique

- Cultural probes
- Grounded Theory
- Scenario analysis
- Activity Theory
- Video eyetracking
- Participatory Design
- Software production
- Design evaluation
- Participatory workshop

- Design brief
- Design brief
- Design brainstorming
- Design brainstorming
- Design brainstorming
- Design brainstorming
Discovery
Who is the user?
Invention
What is possible?
Design

What should it be?
Evaluation
Does it work?

Actions 10 15 20 25 30 35 40 45 50 55
FP MM TG

Each Pair
Student’s t 0.05
Redesign

How to improve it?

Discovering who is the user?

Discovering who is the user

Collect information
- Introspection
- Observation
- Interviews
- Questionnaires

Analyze information
- Grounded theory categories

Resources for design
- User profile
- Persona
- Use scenario

Techniques for Discovering the User

Gather inputs
- Introspection
- Observation
- Interviews
- Questionnaires

Analyze data
- Grounded Theory coding & categories
- Use examples
- User needs

Design resources
- User profile
- Persona
- Extreme character
- Use scenario

- Interactive thread
- Cultural probes
- User workshops
- Lab studies

- Task analysis
- Contextual inquiry
- Survey analysis
- Protocol analysis

- Design brief
- Functional spec
- Design requirements
Techniques for finding out about users

| Do-it-yourself: | Observation: | Watch users in field situations |
|               |             | Watch users in pre-arranged settings |
| Introspection: | Place yourself in the user’s shoes |
| Questionnaire: | Distribute questions to many users |
| Interviews:    | Ask individual users probing questions |

Sampling:
- Research literature: Anthropology, Ethnography, Sociology
- Marketing studies: Business
- Web videos: Marketing
- Documentaries: Journalism

In situ observation

- Observe and record how users perform the task today
- Do not forget:
  - All observers are biased
  - Validity depends upon the details
  - Observing interacting with users
- Consider ethical questions
  - Ask for permission
  - Accept ‘no’ for an answer
  - Do not distribute personal data
- Artists observe through sketches

Observation in the lab

- Ask users to perform specific tasks
  - Basic observation
  - Talk aloud protocol
  - Pairs and shared discovery
- Recording pros and cons
  - Paper: Cheap, fewest details, incomplete
  - Audio: Often useful, but cumbersome to analyze
  - Video: Very detailed, may be too intrusive
    - Lengthy analysis, permits later analysis
  - Logs: Record every keystroke or mouse click
    - Requires a computer; statistical analysis

Direct observation: User studies

- Specific a specific activity
  - Execute a series of tasks
  - Solve a problem
  - Follow a scenario
- Always provide standard instructions
  - Choose at least three real users
- Data coding:
  - Define the categories: discrete or continuous events
  - Measure the degree of confidence
How to ask questions

The form of the question provides the form of the response (habitable sub-languages)

If you want specific, real answers, you must ask the questions correctly

If not, you will get vague general answers that provide little help with design

Careful!
We are not conducting marketing surveys
Our goal is to better understand users to design a better system

Choose questions that support design

Question order matters!!!

Start specific then general
Start with directed then open
Start with facts then opinions

Information Lens interview questions

Filtering electronic mail (2-year study at Xerox PARC)

Users changed their ways of managing their email but
Users also changed how the system designers thought about the system
Specific, directed questions
1. How many messages did you receive today? (count them)
2. Is this a typical day? If not, why not?
3. How many times did you read your mail yesterday?
4. Did you read every message?
5. How many messages did you delete without reading?
6. How many filtering rules do you have?
7. Did any of them fire when you read your mail yesterday?

Specific, open questions
1. Within the last week, did you look for a specific mail message? Did you find it? If so, describe how you found it.
2. Within the last week, did you look for a specific piece of information within your email? Did you find it? If so, describe how you found it.
Critical Incident Question:
3. Within the last week, did any rule not work as expected? If so, what did you do?

General, open questions
NEVER start with these … but ok after they have told you specific, detailed stories of their use of the system
1. Describe how you use your email.
2. Describe how you classify your messages.
3. When do you prefer to use: email, telephone, face-to-face meetings?
4. Has the Information Lens changed how you communicate with your colleagues?

Questionnaires
(For HCID Masters TD, optional for everyone else)
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

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 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:

Specific, directed

Short answer:
- User background: Age, profession, years in the job
- System related: How many messages did you receive today?

Multiple choice:
- I move messages to project folders:
  - o never
  - o rarely
  - o often
  - o always

Scalaire (Likert scale):
- I can easily manage my email
  - Strongly Disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree
  - -2  -1  0  1  2
**Question styles:** Specific, directed

- Ranking
  - Rank the following functions in order of usefulness
    - Blind copy
    - Automatic copy to a distribution list
    - Automatique to myself

**Question styles:** Specific, open

- Short answer
  - User characteristics: What is your favorite rule and why?
  - System interaction: Describe the steps you took when you last created a new rule.

**Question styles:** General, open

- NEVER, NEVER, NEVER start with these questions!!!

- User characteristics:
  - Describe your personality.

- System interaction:
  - Describe how you use electronic mail.

**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
One more reminder

Directed, specific questions are easiest to code. They belong at the beginning of the questionnaire and provide the fewest interesting results.

Open, general questions are very difficult to code and analyze. They may provide very interesting responses, but also risk giving stereotypical responses.

Consider the series of questions

Do they build on each other?

Are they redundant or get at different issues?

What is the balance between:
- Direct vs. Open?
- Specific vs. General?
- Factual vs. Opinion?
- Design-oriented vs. marketing-oriented?

Design vs. Marketing

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.

Summary: Discovering who is the user

Collect information
- Introspection
- Observation
- Interviews
- Questionnaires

Analyse information
- Grounded theory categories

Resources for design
- User profile
- Persona
- Use scenario
Many ways to find out about users

You can collect information yourself:
Observation, Introspection, Interview, Questionnaire
(More advanced techniques:
Focus group, Usability study, Logging study, Diary study …)

You can also take advantage of work done by others:
Market studies, Government reports, Research literature,
Youtube, Ads, Novels, Films, Cartoons …

Many ways to analyze results

Analysis activities
Grounded theory analysis
List of related examples

You could also do a:
GOMS analysis
Contextual inquiry
Task analysis
Protocol analysis
Log analysis
Survey analysis

Many possible design resources

In this course, we’ll talk about:
User profile
Persona
Extreme character
Use scenario

But you can also create:
Requirements list
Storyboard of use
Clips of related examples
Summary video

… and your own design brief

Homework  
due: Tuesday 4 December

1. Group: Choose a topic for your project topic
You need to identify a problem and a set of users

2. Individual: At least two interviews each
Use at least one critical incident question
Probe for details