Advanced Design of Interactive Systems

Lecture 1: Introduction

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ExSitu lab, Inria & Université Paris-Saclay

5 February 2020

Schedule

Monday	Tuesday	Wednesday	Thursday	Friday
		5 Feb 9:00-12:00 Intro EE01-EE02		
10 Feb 9:00-12:00 class EE01-EE02	**11 Feb** 9:00-12:00 class EE01-EE02	**12 Feb** 9:00-12:00 13:30-16:30 class EE01-EE02	**13 Feb** 9:00-12:00 class EE01-EE02	**14 Feb** 13:00-16:00 final presentation

Course Objectives

- Participatory design
  - integrate users into the design process
- Redesign
  - vary methods over time
- Method creation
  - design your own methods and when to use them

Design Philosophy

- Just do it
  - Don't argue … create a design artifact!
- Critical observation (user-oriented thinking)
  - Put yourself in the user's shoes
- Situated interaction
  - Consider the user's context of use

Generative Deconstruction

Emphasis on Participatory Design
Your group will design a system for another group

Process
Problem finding
Deconstruct an existing, system
Reconstruction
Create a new, principled design

Try to incorporate design principles
co-adaptive instruments

Course project

Work in groups of four
some activities are individual, others are in groups

Create a video prototype of an **original** design
that meets the needs of real users in a real setting

Build upon techniques you learned in the HCI Bootcamp
add participatory design and other techniques

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

Design Brief

- Identify key issues for users: what do they need?
- Create a novel, principled design that takes advantage of generative design principles
- Design and run a participatory design workshop work with users to explore new ideas
- Create a final video prototype video
- Present the final design to the class

Topic:

Find activities members of your group enjoy
sports actitivies
cultural activities
creative activities
political activism
. . . ?

General advice

First, find a specific, grounded design problem

Design it to be personalizable, shareable, reusable in different contexts, by multiple people, for different reasons

Ensure that you use instruments, substrates and co-adaptation

Final presentation

15-minute oral presentation includes:
- design problem
- methods chosen and why
- design concept
  explain in terms of design principles
- video prototype (maximum 5 minutes)
  story of use, include breakdowns
- future work
  how would you extend this to a complete system?

5-minute class discussion
- every group asks at least one question

Also due: video prototype, slides, final storyboard

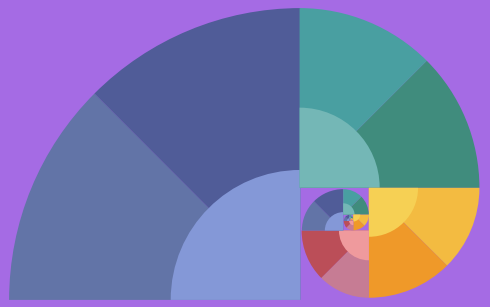
Grades

HCI Bootcamp values:	Process, speed, collaboration *Just do it!*
Advanced course values:	Justified design *Why do it this way?!*

Participation	20 %
Required exercises	20 %
Chosen exercises	20 %
Final Video Presentation	40 %

Focus on ***participatory design*** techniques

Quiz
Remembering HCI Bootcamp



Quiz

A. Understanding users

1a. Is the following a good way to start an interview? Explain

[ ] Yes [ ] No

What do you think about Excel?

How to ask questions

The form of the question
provides the form of the response

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

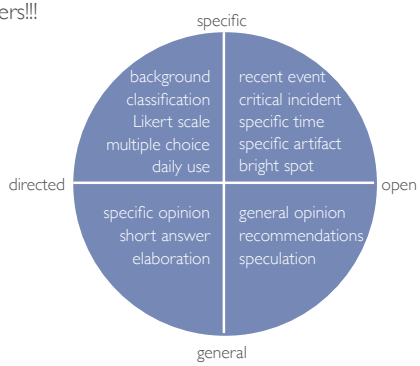
Careful!
We are not conducting marketing surveys
Our goal is to better understand users
to design a better system

Choose story questions that support design

Choose story questions that support design

Question order matters!!!

Start specific
then general

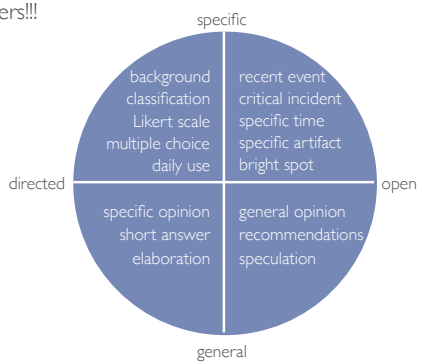


Choose story questions that support design

Question order matters!!!

Start specific
then general

Start with directed
then open



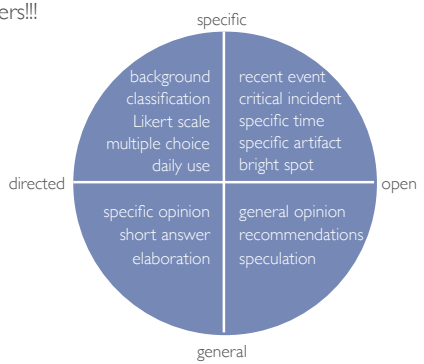
Choose story questions that support design

Question order matters!!!

Start specific
then general

Start with directed
then open

Start with facts
then opinions



Quiz

1. Understanding users
   b. Ask a question (related to *Excel)* using the "critical incident technique.

Critical *incident* technique

Focus on a recent, memorable *event*:
Describe the initial situation
Tell what happened, step-by-step, in as much detail as possible:
What did you do?
How did the system respond?
What did you do next?

Was the situation resolved successfully?
If not, what did you do?

Later: Was this typical?
If typical, find a different example
If unusual, find a typical example

Critical *object* technique

Identify an object that you recently created
What led you to create this object?
Tell what happened, step-by-step, in as much detail as possible:
What did you do?
How did the system respond?
What did you do next?

Were you happy with the result?
If not, what did you do?

Later: Was this typical?
If typical, find a different example
If unusual, find a typical example

Quiz: Understanding users

1. Is this a good way to start an interview?
What do you think about Excel?

[ ] Yes [ ] No

Explain

Quiz: Understanding users

2. Ask a question about Excel using the critical object technique:

Quiz: Understanding users

3. What is the goal of a design interview?

[ ] Gather opinions
[ ] Get a tutorial
[ ] Get a specific story

Quiz: Understanding users

4. Give an example of something an interviewee might say if the interview is going wrong:

Quiz: Understanding users

4. Give an example of something an interviewee might say if the interview is going wrong:

"I usually start by doing ..." → tutorial
"I sometimes do this ..."

"I think it should be like that..." → opinon
"I hate it when it does this..."

... what you want are detailed stories!

Quiz: Understanding users

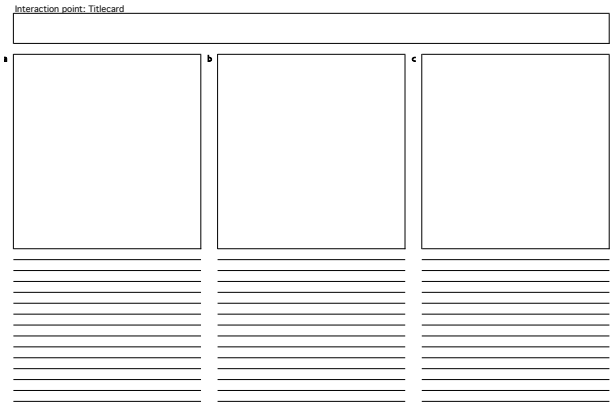
5. What is an interaction point?

Give an example:

Name three design activities that use interaction points

interviews, scenarios, video prototypes

Interaction Point



Interaction Points

Title: Summarize what happened

Identify the sequence of events:
- User acts – System reacts – User reacts
- System acts – User reacts – System reacts

For each segment:
- Sketch what happened (use Verplank's starmen)
- Describe what happened

Quiz: Understanding users

6.a What is a persona? Give an example.

6.b What is an extreme character? Give an example.

6.c How do extreme characters help your design?

Give an example:

Persona

Personal details:	Name, age, gender
	Physical description
	Occupation, relevant activities
	Representative or Extreme user?
Personality:	Describe the person & design-relevant details
	Likes, dislikes?
	Capabilities, weaknesses?
	Unusual characterstics?
Activities:	Typical, breakdowns, user innovations

Identify the relationship with real users interviewed or observed.

Extreme character

Identify people who are extreme along one or more dimensions:

Normal hands	→	Arthritic hands
Takes vitamins	→	Cancer patient
Exercises regularly	→	Athelete
Adult	→	Child

It is useful to brainstorm ideas about what it means to be extreme in the context for which you are designing, even if you do not end up using such extreme characters.

Quiz: Design process

1.a What is the difference between *video brainstorming* and *video prototyping*?

Video brainstorming:
generate as many video ideas as possible, without judging them

Video prototyping:
tell a story about using the system in a real-world context and judge it

Video brainstorming

Goal: Video individual ideas about how the user could interact with the system

Design resources:
Written brainstormed ideas

Each idea has *one* director who controls:
- description of the idea
- how to video the idea
- who will do what

However, different directors can video different variations of the same idea

Video prototyping

Goal: Tell a story that illustrates how the user(s) interact(s) with the system through a series of interaction points

Design resources:
Design concept
User profile, personas
Use scenario with interaction points
Video brainstormed ideas

Create a storyboard to illustrate how the interaction

Follow the storyboard to create the video

Quiz: Design process

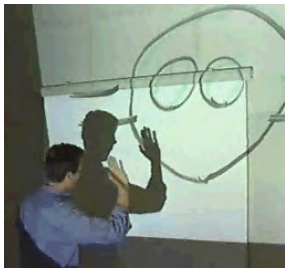
1.b What is the difference between a *video prototype* and a *marketing* or *concept video*?

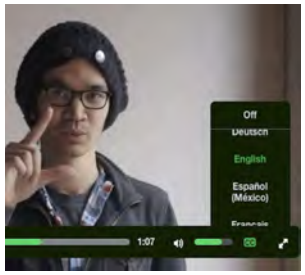
Quiz: Design process

1.b What is the difference between a *video prototype* and a *marketing or concept video*?

Video prototypes:
explore ideas with design team

Marketing videos:
'sell' ideas to attract investors





Quiz: Design process

1.c What is the difference between a *current (use)* scenario and a *future (design)* scenario?

Quiz: Design process

1.d What is the difference between an *instrument* and an *object-of-interest*? Give an example of each.

Quiz: Design process

1.d What is the difference between an *instrument* and an *object-of-interest*? Give an example of each.

Quiz: Design process

1.e What is the difference between a *video prototype* and a *tutorial*?

Quiz: Design process

1.e What is the difference between a *video prototype* and a *tutorial*?

Video prototype:
tells a story of how users in the future will interact with a proposed system, including breakdowns and context

Tutorial:
explains how the specific features work, without context

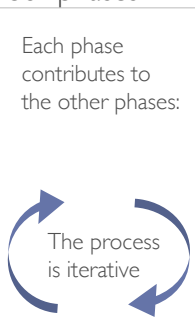
Quiz: Design process

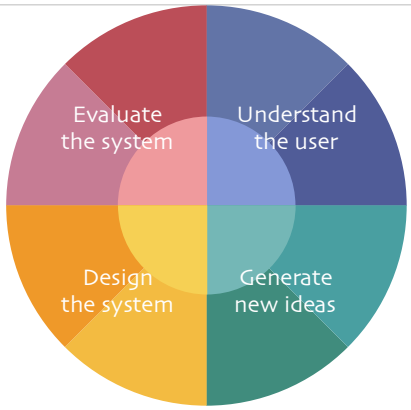
2.a. What are the four main phases of the design process?
(hint: key types of design activities)
Discovery
Invention
Design
Evaluation

Each phase involves which three key activities?
Collect or generate material
Interpret or analyze material
Produce a design resource

Four phases

Each phase contributes to the other phases:





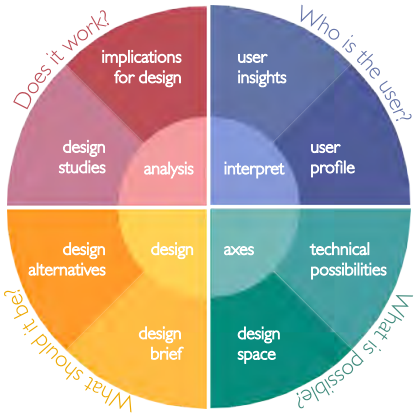
Generative Design

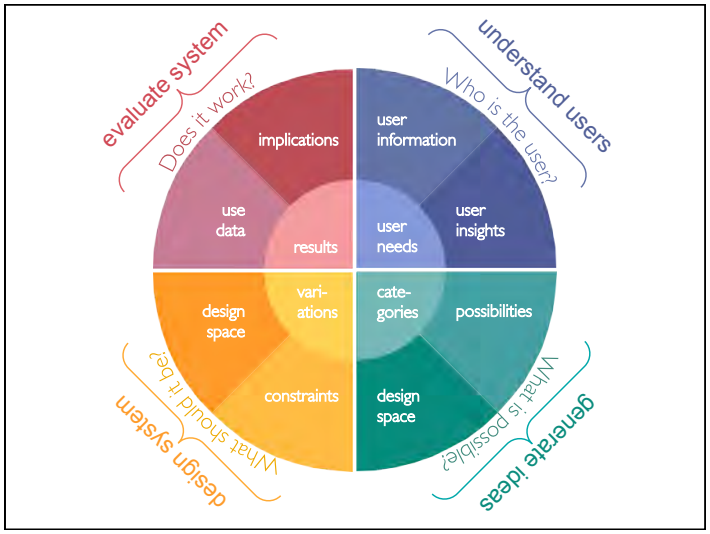
Each phase includes:

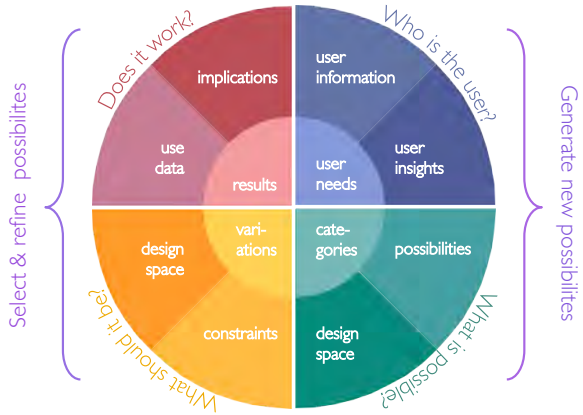
Collecting or sampling information

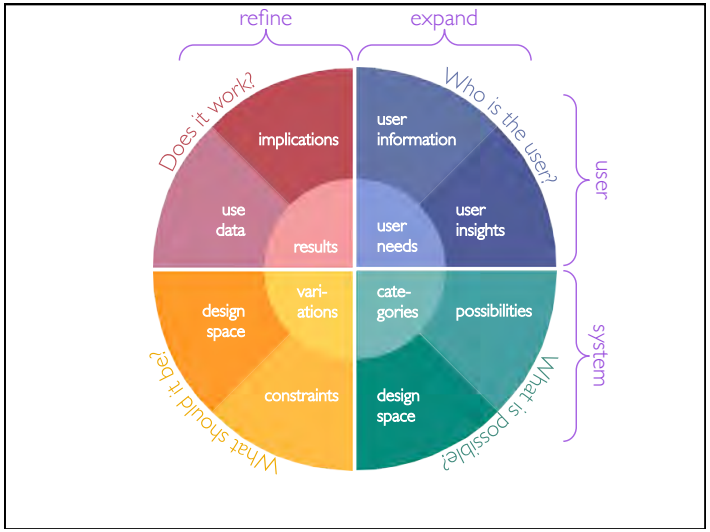
Analyzing information

Generating design resources









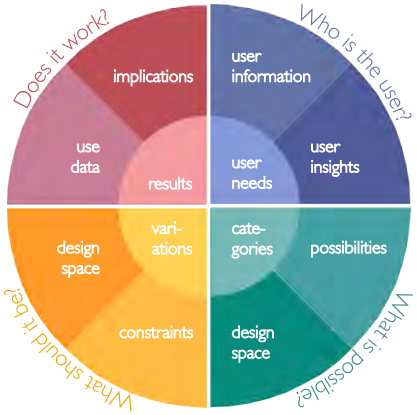
Generative Design

Discovery
- Collect User Information
- Explore User Needs
- Produce User Insights

Invention
- Collect Possibilities
- Explore Categories
- Produce Design Space

Design
- Collect Constraints
- Explore Variations
- Produce Prototype

Evaluation
- Collect Use Data
- Explore Results
- Produce Implications



Quiz: Design principles

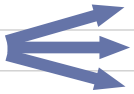
C. Instrumental Interaction involves three key properties. What are they? Describe them.

1. Reification
2. Polymorphism
3. Reuse

Quiz: Design principles

C. Instrumental Interaction involves three key properties. What are they? Describe them.

Reification



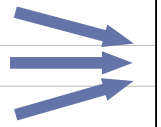
Turns concepts into (interface) objects

Interaction instrument
- Reification of a command into an interface widget

Example :
- scrolling a document -> scrollbar

Examples
- Guidelines: reification of alignment
- Layers: reification of mode

Polymorphism



Extends commands to multiple object types

Common examples:
- Cut, paste, delete, move

Context-dependent commands

Homogenous groups
- If applicable to one object, then applicable to a group of same-type objects

Heterogeneous groups
- Applicable to a heterogeneous group if it has meaning for individual object types

Reuse

Captures interaction patterns for later reuse

Output reuse
- Reuse previously created objects
- Example: duplicate, copy/paste

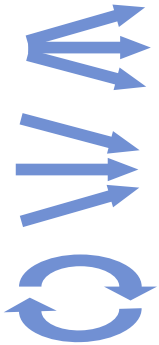
Input reuse
- Reuse previous commands
- Example: redo, history, macros

Generative power: Three design principles

Reification
- extends the notion of what constitutes an object

Polymorphism
- extends the power of commands with respect to these objects

Reuse
- provides a way of capturing and reusing interaction patterns



Quiz: Design principles

2. What is a co-adaptive system? Give an example.

Key phenomenon: *Co-adaptation*

Users *adapt* to a new system
they **learn** to use it

Users *adapt* the new system to their own needs
they **appropriate** and change it

Creative activities require both
especially when integrating physical and digital information

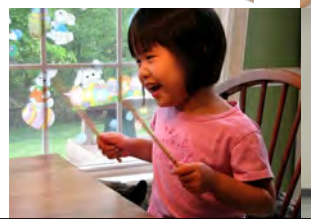
Create digital tools that are as intuitive, and learnable,
as physical tools

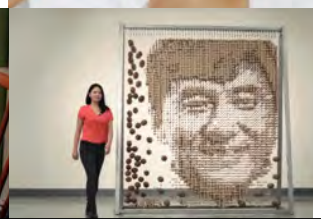
We learn (adapt to) a hammer's properties

But we also adapt (or appropriate) other tools

Many physical tools are easy to appropriate

… why not software?





Reciprocal Co-adaptation

People adapt their behavior to technology
… they learn it
People adapt the technology for their own purposes
… they appropriate it

Computers adapt their behavior to people
… machine learning
Computers adapt human behavior
… training

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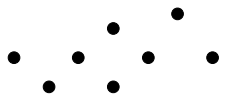
Quiz: Design principles

c. What is a substrate? Give an example. (extra credit)

Quiz: Design principles

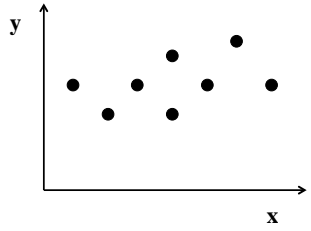
3. What is a substrate? Give an example. (extra credit)



Quiz

3. Design principles

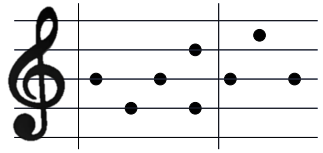
   c. What is a substrate?
   Coordinate system



Quiz

3. Design principles

   c. What is a substrate?
   Music system



Quiz: Design principles

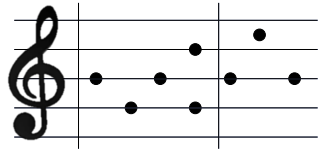
c. What is a substrate?

1. Contains data
2. Manages constraints and relationships
3. Interprets rules

Quiz

3. Design principles

   c. What is a substrate?
   Music system



Layered substrates:
Treat notes as pixels (bitmap editor),
as notes in a score (Finale),
or as musical notes (Open Music)

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cultural activities
creative activities
political activism
. . . ?