User Centered Design Process
May 1 - June 14

History of user centered design in HCI
June 19, June 21

Academic HCI
June 26, June 28

Special topics in HCI
July 5, July 10

Course Review
July 12, July 17

Presentation 2
July 19

Last class
July 24
Course Review

Value Proposition
Value Proposition

UX

1. Identify key objectives and desired outcomes
2. Identify corresponding critical aspects of the user experience
3. Identify the design work that can be done
Data Triangulation

- One question - several methods
- Cross verification

Quantitative
- Fixed & measurable reality
- Analyzed numerically and statistically

Qualitative
- Dynamic & descriptive reality
- Analyzed by themes

Field
- Natural Environment
- Uncontrolled

Lab
- Artificial Environment
- Well Controlled

Behavioural
- What people do

Attitudinal
- What people think / feel
Understand Your Users: Exploratory Studies

Exploratory Study

Motivational system
- Goals and tasks ("need")
- Desirability ("want")
- Emotional charge ("fears", frustration, pleasure, etc.)

Contextual knowledge & beliefs
- A cognitive representation (understanding) of how something works / organised
- Based on previous experience & believes; defines reasoning

Cognitive (Mental) model
Understand Your Users: Exploratory Studies

There is a product

- True-Intent Studies
- Remote Unmoderated Usability Studies
- Intercept Surveys
- Clickstream Analysis

There is NO product

- Diary/Camera Studies
- Participatory Design
- Questionnaires
- Observations
- Interviews
- Ethnographic Field Studies
- Contextual inquiry
Where do you usually eat the following food?

- Home
- Work
- School
- N/A

Ice-cream
Salad
Fruits

What color is your favorite ice-cream?

- Red
- Blue
- White
- Other: ______

My favorite taste of ice-cream is ________.
I usually eat it at (in) ____________________
when I am ____________________________.

Any of us can sometimes unexpectedly run out of ice-cream. What do you usually do in such situations?

____________________________________

____________________________________

Where would you describe this ice-cream?

- Tasty
- Cheap
- Satisfying
- Tasteless
- Expensive
- Disappointing

Ice-cream is my favorite food at this restaurant:

Strongly Agree

Neutral

Strongly Disagree

What is the first word that comes to mind when you see the following:

Summer, Tasty, Cold, Flavour

________________________________
Understand Your Users: Exploratory Studies

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- Observations
- Interviews

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- Contextual inquiry
Understand Your Users: Exploratory Studies

Naturalistic

Controlled

Observations

Non-Participatory

Passive Participation

Active Participation

Complete Participation
Understand Your Users: Exploratory Studies

Observations

- Record artifacts users manipulate
- Use codes and symbols
- Separate “says” and “does”
- Keep your side notes separately
- Separate actions and body language
- Separate tasks, goals, motivations
- Separate observations and interpretations
Understand Your Users: Exploratory Studies

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Understand Your Users: Interview

Interviews

- Structured
- Semi-Structured
- Narrative (Unstructured)
- Focus Groups
Understand Your Users: Exploratory Studies

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Understand Your Users: Exploratory Studies

Validity of Research Design
Understand Your Users: Exploratory Studies

Validity of Research Design

External Validity
- Selection of the sample
- Size of the sample
- Experimental Situation
- Time of the study

Internal Validity
- Consistency of instruments
- Reactivity

Generalizability of outcomes

Trustworthiness of measurement
Understand Your Users: Exploratory Studies

Reactivity

- Hawthorne (observer) effect
- Expectancy effect (expectancy bias)
- Conformity effect
- Social desirability effect
Translating Needs Into Functionalities

Make data actionable
- Adjust personas
- Affinity diagrams
- Breakdowns
- Cultural model
- Artifact models

Identify right time and place
- Physical model
- Sequence model
- Flow model

Turn problems into tasks
- Thinking
- Memory
- Attention
- Motivations
- Habitation
Understand Your Users: Analyzing Qualitative data

Affinity Diagram

- Prepare space
- Use color
- Use all data
- Review the cards
- Sorting and grouping
- Smaller Subgroups
- Themes in Data
- Regroup often
- Use fresh view
- Give it time
- Trust it

Notes on cards
Translating Needs Into Functionalities

Make data actionable
Adjust personas
Affinity diagrams
Breakdowns
Cultural model
Artifact models

Translating Needs Into Functionalities

External influences - because:
“Work takes place in a culture, which defines expectations, desires, policies, values, and the whole approach people take to work”

Contextual design: defining customer-centered systems.

Includes:
- Influencers (represented as bubbles)
- Extent of influence (overlap of bubbles)
- Influences (as arrows - mind direction)
- Breakdowns
Translating Needs Into Functionalities

Make data actionable

Adjust personas
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Translating Needs Into Functionalities

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Translating Needs Into Functionalities

Identify right time and place

Physical model
Sequence model
Flow model
Translating Needs Into Functionalities

- Identify right time and place
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Translating Needs Into Functionalities

Identify right time and place

Physical model

Sequence model

Flow model
Translating Needs Into Functionalities: Preparation

- Cultural Model (External influences)
- Artifact Model (Physical objects)
- Affinity Diagram
- Work Models
  - Personas
  - Flow Model (communication and coordination)
- Physical Model (Physical work environment)
- Sequence Model (Work steps)
Translating Needs Into Functionalities

Make data actionable
- Adjust personas
- Affinity diagrams
- Breakdowns
- Cultural model
- Artifact models

Identify right time and place
- Physical model
- Sequence model
- Flow model

Turn problems into tasks
- Thinking
- Memory
- Attention
- Motivations
- Habituation
Translating Needs Into Functionalities

- Turn problems into tasks
- Dual process theory
- Thinking
  - Memory
  - Attention
  - Motivations
  - Habituation

- Hard to read = hard to do
- In group favoritism
Translating Needs Into Functionalities

- Turn problems into tasks
- Dual process theory
  - Cognitive load

Thinking
- Memory
- Attention
- Motivations
- Habituation

Perception biases
- Hard to read = hard to do; in-group-out-group bias;

Expectations determine perception

Anticipate mistakes
- (easy to undo, avoid error-prompt tasks)
Translating Needs Into Functionalities

Cognitive load

Steps
- Least amount of work possible
- Homogeneous
- People can’t multitask!
- Break error-prone tasks into smaller steps.

Choices
- Clear differences
- Limit number of choices
- Support with information

Information
- Progressive disclosure
- Provide examples
- Make it easy to scan
- Presentation matters (hard to read = hard to do)
Translating Needs Into Functionalities

**Thinking**
- Memory
- Attention
- Motivations
- Habituation

**Turn problems into tasks**

**Dual process theory**

**Cognitive load**

**Anticipate mistakes**
(should be easy to undo, avoid error-prompt tasks)

**Perception biases**
(expectations determine perception)

**Age, socioeconomic status, cognitive abilities influence decision making**
Translating Needs Into Functionalities

- Turn problems into tasks
- Perception - storage - retrieval
- Recognition rather than recall
- People can remember ~3-4 items at a time.
- Zeigarnik effect - interrupted tasks are easier to remember (depends on the importance of the interrupted task for the person)
Translating Needs Into Functionalities

- Turn problems into tasks
- Focused attention is limited and selective
  - Inattentinal blindness
  - Surface (awareness of features) and content attention (awareness of information)
  - Attention is dynamic - allow hierarchy

- Thinking
- Memory
- Attention
- Motivations
- Habituation
Translating Needs Into Functionalities

- Turn problems into tasks
- Thinking
- Memory
- Attention

- Tention from unmet needs (based on formed expectations)
- Work must be meaningful
- Reward wisely
- Desire to belong to a group
- In-group/out-group biases

- Motivations
- Habituation
Translating Needs Into Functionalities

Turn problems into tasks
- Thinking
- Memory
- Attention
- Motivations
- Habituation

Pavlov’s conditioning
- Skinner’s operant conditioning (with reinforcement)
- Based on formed patterns
- Creating new habits: stimulus - response; breaking the pattern
Course Review

Value Proposition

Understand your users

Translate needs into functionalities

Create design ideas
Create Design Ideas

Create Ideas

Design
Create Design Ideas

Create Ideas

Creativity - process of producing a new idea which has value to someone

Nature vs Nurture

Generating ideas: memories ➔ ordinary ➔ extraordinary
Create Ideas

Creative process

1. Preparation
2. Provocation
3. Incubation
4. Eureka moment
5. Verification
6. Realization

Create Design Ideas
Create Ideas

1. Preparation
   - Define the constraints: goals, parameters of the challenge, resources, time
   - Knowledge and understanding around the challenge: both academic and casual
   - Challenge all the assumptions
Create Design Ideas

Create Ideas

2. Provocation

Overcoming associative limitations

Design Fixation

Concept of po by Edward de Bono

Force of habits

Framing and reframing problems

Practice true randomness

Connect and combine

Change the routine
Create Design Ideas

Create Ideas

- Mindful procrastination can sometimes be helpful
- Different aspects of creativity require different brain activity

3. Incubation
- Most ideas are formed subconsciously
Create Design Ideas

Create Ideas

An idea that might solve the challenge is pushed to the conscious level

4. Eureka moment

Usually difficult to explain how you came up with this idea

Always write it down in the moment no matter what
Create Design Ideas

Create Ideas

5. Verification

- All ideas are rough when they are first visualized - get through the criticism
- Be optimistic, give your crazy ideas a chance
- No right answers, only working solutions
Create Design Ideas

Create Ideas

1. Preparation
2. Provocation
3. Incubation
4. Eureka moment
5. Verification
6. Realization
Create Design Ideas

**Sketches**
- illustration of how the basic concept works

**User stories**
- description of a feature from an end-user perspective

**Wireframes**
- static representation of the UI layout and user flow

As a user / <persona>, I want / need <action> so that I can <user goal>.

Image: https://www.behance.net/gallery/13421913/Wireframes-Restaurant-App
Create Design Ideas

**Design**

**Interface** - a surface/place where two independent systems, bodies or spaces meet / form a common boundary, and communicate with each other

**Interface** - a communication channel

**Communication** - exchanging of information
Create Design Ideas

Design

Semiotics - the study of signs and symbols

Sign - anything that communicates a meaning

Representamen (signifier) - the form of the sign

Interpretant - what people make of the sign

Object (signified) - the actual reference of the sign
Create Design Ideas

**Design**

- **Signifier** - indicators of any type that communicate the action needed so the affordance can take place
- **Affordance** - the possible use for an object when interacting with it
- **Constraints** - restrictions that limit the possible actions available with an object
- **Feedback** - conveys effects of user’s actions
- **Discoverability** - whether it’s possible to figure out how to use an object by interacting with it
- **Mapping** - indication of the relationship between objects
- **Conceptual Model** - user’s understanding of how the system works
Create Design Ideas

Design

Signifier - indicators of any type that communicate the action needed so the affordance can take place

Affordance - the possible use for an object when interacting with it

Constraints - restrictions that limit the possible actions available with an object

Physical - caused by physical features

Cultural - based on what is culturally accepted

Semantic - based on the meaning of the situation

Logical - use reasoning to determine the alternatives
Create Design Ideas

Design

- **Signifier** - indicators of any type that communicate the action needed so the affordance can take place
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Information Architecture - structural design of shared information environments

Richard Saul Wurman

Create Design Ideas

Prototype Design

Users flow through your product
Catalog user's information
Presentation of the information
Decision driving function
Create Design Ideas → Prototype Design

Knowledge Organisation

- Taxonomy
- Folksonomy
- Domain Analytics Approach
Create Design Ideas

Prototype Design

Knowledge Organisation

Taxonomy

Practice of classification based on hierarchical relationship.
Parent-child hierarchies

Folksonomy

Practice of classification based on non-hierarchical relationship.
Public tags and their frequencies

Domain Analytics Approach

Practice of classification based on sociological-epistemological view.
Indexing is suited to fulfill a task by specific group
Prototype Design

Prototypes - interactive design model of the product

- Low-fidelity
- High-fidelity

Breadth - number of covered features
Depth - degree of functionality
Appearance - building means
Input methods - device mediation
Prototype Design

- Interactive design model of the product

Prototypes
- Low-fidelity
- High-fidelity

Testing and Evaluation

Visualization

Create Design Ideas

Static representations of the product
- Sketches
- Wireframes
- Mockups
Prototype Design

Paper Prototyping Tips

- Make it large
- Add ideas as they come
- Make it monochrome
- Work fast!
- Preprint widgets
- Use audio description
- One sketch per screen
Course Review

Value Proposition

Understand your users

Translate needs into functionalities

Create design ideas

Prototype design
Prototype Design

Paper Prototyping Evaluation

1. Identify testing goals
2. Identify items to test
3. Choose testers
4. Prepare materials
5. Assign team roles
6. Run evaluation