CSE 118
Introduction to Design
Mini Quiz Week 5/6

What is Design ?
What is Design?
Definition of DESIGN

transitive verb

1. to create, fashion, execute, or construct according to plan: DE VISE, CON TRIVE • design a system for tracking inventory

2. a: to conceive and plan out in the mind • he designed the perfect crime
   b: to have as a purpose: INTEND • she designed to excel in her studies
   c: to devise for a specific function or end • a book designed primarily as a college textbook
      • a suitcase designed to hold a laptop computer

3. archaic: to indicate with a distinctive mark, sign, or name

4. a: to make a drawing, pattern, or sketch of
   • ... a curious woman whose dresses always looked as if they had been designed in a rage ... —Oscar Wilde
   b: to draw the plans for • design a building • designing a new bike
Definition of design in English:

**design**

**NOUN**

1 A plan or drawing produced to show the look and function or workings of a building, garment, or other object before it is made.

‘he has just unveiled his design for the new museum’

[more example sentences] [synonyms]

1.1 [mass noun] The art or action of conceiving of and producing a plan or drawing of something before it is made.

‘good design can help the reader understand complicated information’
Design

Design is the creation of a plan or convention for the construction of an object, system or measurable human interaction (as in architectural blueprints, engineering drawings, business processes, circuit diagrams, and sewing patterns). Design has different connotations in different fields (see design disciplines below). In some cases, the direct construction of an object (as in pottery, engineering, management, coding, and graphic design) is also considered to use design thinking.

Designing often necessitates considering the aesthetic, functional, economic, and sociopolitical dimensions of both the design object and design process. It may involve considerable research, thought, modeling, interactive adjustment, and re-design. Meanwhile, diverse kinds of objects may be designed, including clothing, graphical user interfaces, skyscrapers, corporate identities, business processes, and even methods or processes of designing.

Thus "design" may be a substantive referring to a categorical abstraction of a created thing or things (the design of something), or a verb for the process of creation as is made clear by grammatical context. It is an act of creativity and innovation.
DESIGN IS A PROCESS...
Human-Centered Design
Human-Centered by Design
Design Methods
Principles of Human-Centered Design

- Early focus on users
- Empirical measurement
- Iterative design
Design Process and Products

Plan UCD: Decisions about which methods to use

Specify context of use: Description of users, tasks, context, problems

Evaluate against requirements: Data on how well system meets expectations

Specify user/org requirements: Statements about what the design should fulfill

Produce Design Solutions: System specifications
## Methods available at Different Stages...

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**Planning:** Usability planning and scoping, Usability cost/benefit analysis.

**Context of Use:** Identify stakeholders, Context of use analysis, Survey of existing users, Field study / user observation, Diary keeping, Task analysis.

**Requirements:** Stakeholder analysis, User cost-benefit analysis, User requirement interview, Focus groups, Scenarios of use, Personas, Existing system / competitor analysis, Allocation of function...

**Design:** Brainstorming, Parallel design, Design guidelines and standards, Design Patterns, Storyboarding, Affinity diagrams, Card sorting, Paper prototyping, Software prototyping, Organizational prototyping.

**Evaluation:** Participatory evaluation, Assisted evaluation, Heuristic or expert eval., Controlled user testing, Satisfaction questionnaires, Assessing cognitive workload, Critical incidents, Post experience interviews.
User Center
System Design
User Center Design
Designing Interactive Systems
Who will use the system?
User-centered Design (UCD)

- “The User-centered design (UCD) process outlines the phases throughout a design and development life-cycle all while focusing on gaining a deep understanding of who will be using the product” (Usability.gov)

- "Human-centred design is an approach to interactive system development that focuses specifically on making systems usable. It is a multi-disciplinary activity." (ISO 13407)

- “Framework of processes (not restricted to interfaces or technologies) in which usability goals, user characteristics, environment, tasks and workflow of a product, service or process are given extensive attention at each stage of the design process.” (Wikipedia)
User Centered Design
Develop usable systems
Understanding users’ needs

• Need to take into account what people are good and bad at

• Consider what might help people in the way they currently do things

• Think through what might provide quality user experiences

• Listen to what people want and get them involved

• Use tried and tested user-centered methods
Understanding users’ needs
From problem space to design space
A framework for analyzing the problem space

• Are there problems with an existing system or user experience? If so, what are they?

• Why do you think there are problems?

• How do you think your proposed design ideas might overcome these?

• If you are designing for a new user experience how do you think your proposed design ideas support, change, or extend current ways of doing things?
From problem space to design space

• Having a good understanding of the problem space can help inform the design space
  • e.g. what kind of interface, behavior, functionality to provide
  • But before deciding upon these it is important to develop a conceptual model
Conceptual model

• A conceptual model is:
  • “a high-level description of how a system is organized and operates” (Johnson and Henderson, 2002, p 26)
  • … it enables
    • “designers to straighten out their thinking before they start laying out their widgets” (p 28)
Conceptual model: components

- Metaphors and analogies
  - Understand what a product is for and how to use it for an activity
- Concepts that people are exposed to through the product
  - Task-domain objects, their attributes, and operations (e.g. saving, revisiting, organizing)
- Relationship and mappings between these concepts
Interface metaphors

- Makes learning new systems easier
- Exploit user’s familiar knowledge, helping them to understand ‘the unfamiliar’
  - An icon of a shopping cart for placing items into
- Make digital products accessible to a greater diversity of users
Refining
Ideas and Prototyping
Design right vs. Right design

• Getting the design right
  • Generate an idea
  • Iterate and develop it

• Getting the right design
  • Generate many ideas and variations (Generation)
  • Reflect and choose (Reduction)
  • Then iterate and develop your choice
Getting the design right

• Optimal design solution for one idea
Getting the right design

- Problem: final design can be only as good as that idea
- If the idea is not a good one, then the ‘best’ design solution will only be so-so
Different ideas first

Circular

Tabular

Linear
The design funnel
Prototyping is important!

Aston Martin looking for clay sculpting apprentices

Buy 3D model
Prototyping shoewear
Prototypes: New devices
Design Thinking

- **Empathise**: Learn about the audience for whom you are designing.
- **Define**: Construct a point of view that is based on user needs & insights.
- **Ideate**: Brainstorm & come up with many creative solutions.
- **Prototype**: Build a representation of one or more of your ideas to show to others.
- **Test**: Return to your original user group & testing your ideas for feedback.
Prototyping
Problem Space

Creating Choices  Making Choices  !

Solution Space

Creating Choices  Making Choices

Understand  Observe  Define Point-of-View  Ideate  Prototype  Test

Info-Graphic of Design Thinking Steps and Mindset at SAP.
Derived from Tim Brown, IDEO & HPVD-School, Potsdam
Illustrated by Tobias Hildenbrand, SAP
Sketching vs. Prototyping

Early design
- Brainstorm different representations
- Choose a representation
- Rough out interface style
- Task centered walkthrough and redesign
- Fine tune interface, screen design
- Heuristic evaluation and redesign
- Usability testing and redesign
- Limited field testing
- Alpha/Beta tests

Late design
- Sketches & low fidelity paper prototypes
- Medium fidelity prototypes
- High fidelity prototypes
- Working systems

Saul Greenberg
About IDEO

We are a global design company committed to creating positive impact.

Our Story

From designing the first manufacture mouse for Apple to advancing the practice of human-centered design, IDEO has long been at the forefront of creating change through design. See some of the highlights from our decades of history.
IDEO Deep Dive
Thanks