HUMAN COMPUTER INTERACTION

Week 2: Design

- Design?
- Good Design?
- Design: Art or Engineering?
- Human Diversity
- Computing Diversity
- Design Principles
- Design Project

What is Design?

DESIGN

*"**Design** has many connotations. It is the organisation of materials and processes in the most productive, economic way, in a harmonious balance of all elements necessary for a certain function. It is not a matter of facade, of mere external appearance; rather it is the **essence** of products and institutions, penetrating and comprehensive.*

***Designing** is a complex and intricate task. It is the integration of technological, social and economic requirements, biological necessities, and the psychophysical effects of materials, shape, colour, volume, and space: thinking in **relationships**."*

Moholy-Nagy, László (1947). Vision in Motion (Chicago: Theobald), p. 42

DESIGN

"*In most people's vocabularies,* ***design*** *means veneer. It's interior decorating. It's the fabric of the curtains and sofa. But to me, nothing could be further from the meaning of design.* ***Design*** *is the fundamental soul of a man-made creation that ends up expressing itself in successive outer layers of the product or service.*"

Steve Jobs: *CEO, Apple Computer, as cited in Fortune magazine, January 24, 2000*

DESIGN

*"**Design is a multi-faceted, complex enterprise.** It involves the initial choice of what to make, a deep understanding of people, of materials, and of technology. It requires understanding how people decide upon purchase, and then use products. It covers an extremely wide range of activities and different disciplines of study and training. It is this depth and richness that makes design such a wonderful, fascinating field."*

Donald Norman, JND.org. (2016)
"*The Future of Design: When you come to a fork in the road: Take it.*"

Q: What does this mean for Design Education?

DESIGN

" What is design? … It's where you stand with a foot in two worlds – the world of ***technology*** *and the world of people and* ***human purposes*** *– and you try to bring the two together."*

Mitch Kapor in Winograd (1996), p.1.

"*Modern design is the interface between* ***technology*** *and* ***people***."

Donald Norman, JND.org

POET: DONALD NORMAN (1988)

"The human mind is exquisitely tailored to make sense of the world. Give it the slightest clue and off it goes, providing explanation, rationalization, understanding.

Consider the objects - books, radios, kitchen appliances, office machines, and light switches - that make up our everyday lives. Well-designed objects are easy to interpret and understand. They provide visual clues to their operation.

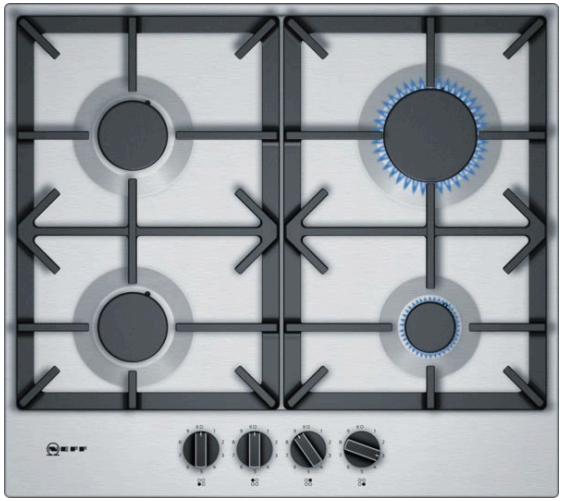
Poorly designed objects can be difficult and frustrating to use. They provide no clues - or sometimes false clues. They trap the user and thwart the normal process of interpretation and understanding. Alas, poor design predominates. The result is a world filled with frustration, with objects that cannot be understood, with devices that lead to error."

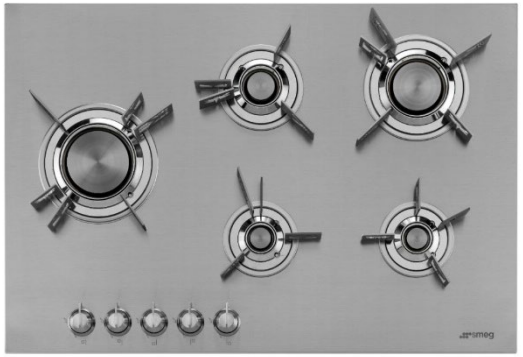
GOOD & BAD DESIGNS

- There is no "right" design, just good and bad designs
- List the following and reasons for your choice:
  - Well-designed object:
    - non-computer
    - computer system
  - Poorly-designed object:
    - non-computer
    - computer system

From: www.baddesigns.com


NORDMENDE




smeg


So...which way do I go?
Rooms
101-113
Rooms
114-128

The best designs speak without words:

Physically, intentionally, or otherwise


PUSH


TO OPEN DOOR
LOOK TO YOUR LEFT
PUSH SIGN
MARKED
DOOR

GOOD DESIGN

- Good design is about ***communication***
- Communicates its purpose clearly: doors, vending machines, chairs
- Design is concerned with finding the representation best suited to the ***communication*** of some specific information
- HCI design: communication is the overriding concern; creative expression is simply one means to this end

GOOD DESIGN

"I am convinced that a well-thought-out design is decisive to the quality of a product. A poorly-designed product is not only uglier than a well-designed one but it is of less value and use. Worst of all, it might be intrusive."

Dieter Rams, 1976

GOOD DESIGN?

Good Design (Dieter Rams):

1. Is innovative
2. Makes a product useful
3. Is aesthetic
4. Makes a product understandable
5. Is unobtrusive
6. Is honest
7. Is long-lasting
8. Is thorough down to the last detail
9. Is environmentally friendly
10. Involves as little design as possible

DESIGN: ART OR ENGINEERING?

ART / DESIGN?

- *"A designer who wants to achieve good design must not regard himself as an artist who, according to taste and aesthetics, is merely dressing-up products with a last-minute garment.*

The designer must be the gestaltingenieur or ***creative engineer****. They synthesize the completed product from the various elements that make up its design. Their work is largely rational, meaning that aesthetic decisions are justified by an understanding of the product's purpose."*

Dieter Rams (NY, Dec 1976)

ART / DESIGN?

- Design: ***Form*** (aesthetics) and ***Function*** (purpose)
- *Art* is valued for its originality and expressiveness: exists for its own sake
- *Design* is valued for its fitness to a particular user and task: must always solve a real-world problem
- Design aesthetic is always related to the intended function of the resulting product
- Designers constantly resolve conflicting demands imposed by the problem, the budget, the schedule and the desired quality level

ART / DESIGN?

- Art creates problems; Design solves problems
- Art is interpretative; Design is unanimous
- Art is exploration; Design is observation & iteration
- Art has no goal; Design has specific goals
- Art creates for the artist; Design creates for the end user
- Designers follow function; Artists follow form

- Design: Art or Engineering?

  Goran Peuc, Principal UX Designer,

  SAP Dublin

"WHILE GREAT ART MAKES YOU WONDER, GREAT DESIGN MAKES THINGS CLEAR"

JOHN MAEDA, PRESIDENT RISD

GOOD DESIGN?

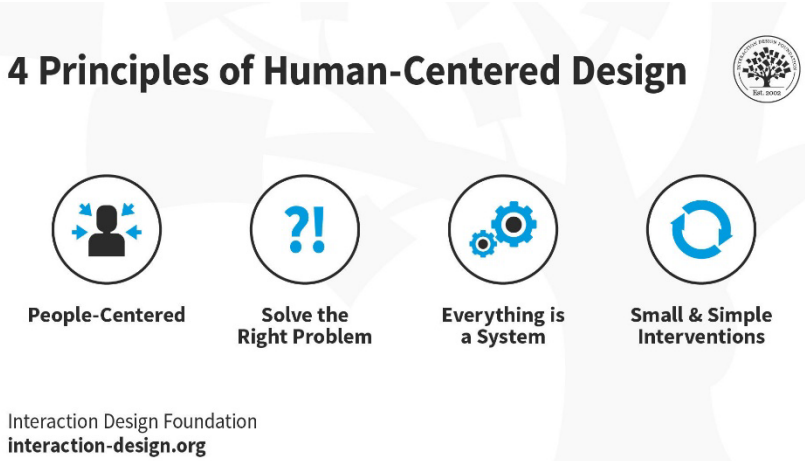
" Designing an object to be simple and clear takes at least twice as long as the usual way. It requires concentration at the outset on how a clear and simple system would work, followed by the steps required to make it come out that way - steps which are often much harder and more complex than the ordinary ones. It also requires relentless pursuit of that simplicity even when obstacles appear which would seem to stand in the way of that simplicity."

T. H. Nelson, *The Home Computer Revolution*, 1977

HUMAN CENTRED DESIGN

"Design is the central discipline for humanising all technologies: turning them to human purpose and enjoyment"

(Buchanan)



HUMAN DIVERSITY

- Human Purpose & Enjoyment
- Human?
- Universal Design: Design for all
- Human Diversity:
  - Perception
  - Cognition
  - Physical: abilities & disabilities
  - Emotional
  - Personality
  - Cultural
- Human Diversity increases design complexity

INCLUSIVE DESIGN

- Barriers to inclusivity:
  - Permanent
  - Temporary
  - Situational
- *Inclusive design is a methodology, born out of digital environments, that enables and draws on the full range of human diversity. Most importantly, this means including and learning from people with a range of perspectives.*

  - Microsoft
- How to? User Research

COMPUTER DIVERSITY

- Computer?
- Computing Paradigms:
  - Large Scale Computing
  - Personal / Networked Computing
  - Mobile Computing
  - Wearable / Ubiquitous Computing
  - Collaborative Environments
  - Virtual Reality / Augmented Reality
  - Architectures: Kiosks, Appliances, Robots
  - IOT

COMPUTING PARADIGMS

GOOD DESIGN?

- *Effective Design: exploiting power of technology to support human needs and limitations:*
  - From "user" to "human" to "humanity"
  - Understand human needs
  - Anticipate human interactions with systems
  - EG: Save prompts; Aviation?

Donald Norman: What is User Centred Design?

DESIGN CONCERNS

Question: How to design effectively for human diversity?

- Access: barriers
- Usability: quality
- Acceptability: context
- Engagement: wow factor

GOOD DESIGN

Design Principles Inform Design

- Generalisable abstractions for thinking about designs
- Guide designer during design process & to critique and evaluate design ideas
- Derived from a mix of theory-based knowledge, experience and common-sense

➔ *The computer does the work and the person does the thinking*

DESIGN PRINCIPLES

- *How to design?*
  - ***Learnability***: help people "learn" the system
  - ***Accommodation***: help people "use" the system in a way that suits them

    and
  - ***Effectiveness***: help people use the system effectively

DESIGN PRINCIPLES

- *Learnability*: help people access, learn and remember the system
- Reduce user's cognitive load:
  - **Visibility**: voice-mail vs. answer machine; hamburger menus
  - **Consistency**: word processing menus
  - **Affordance**: door handle affords pulling: clues
  - **Familiarity**: familiar language and symbols

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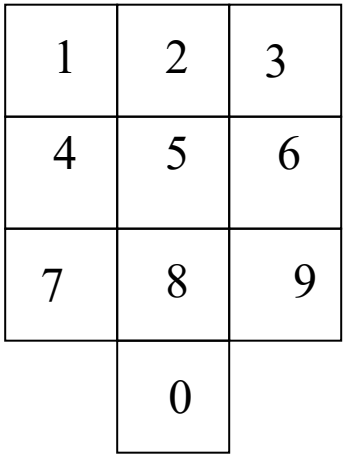
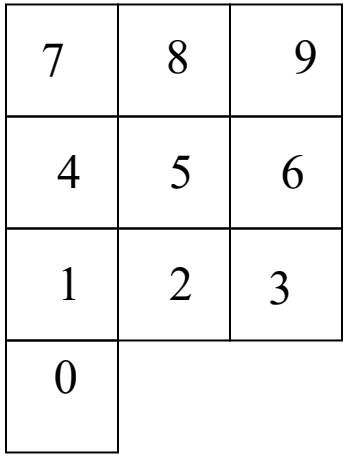
(a) phones, remote controls



(b) calculators, computer keypads



Why Won't They Work?

DESIGN PRINCIPLES

- *Accommodation*: in a way that suits them
- Increase user confidence:
  - **Flexibility**: accommodate different levels of experience
  - **Style**
  - **Conviviality**: polite, friendly and generally pleasant

DESIGN PRINCIPLES

- *Effectiveness*: increase users' sense of being in control, know what to do & how to do it:
  - **Navigation**
  - **Control**: allow people to take control (clear mappings)
  - **Constraints**: helps people not to do things that are inappropriate (greyed menu options) CUI
  - **Recovery**
  - **Feedback**: constant and consistent feedback enhance sense of control (cursor movement) Google's Material Design

LECTURE 2 SUMMARY

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