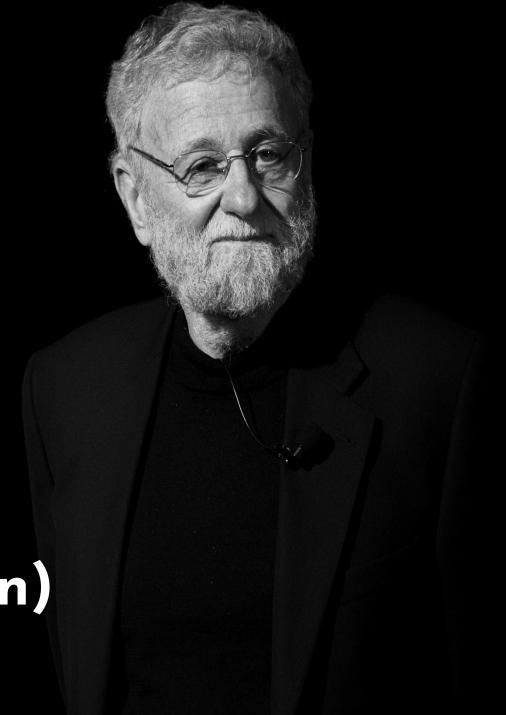# Week 4

The Ideas of Design 2:
The User-Centered Perspective OR The Human-Centered Design (HCD)

Social Theory &
Design Thinking (2410302)
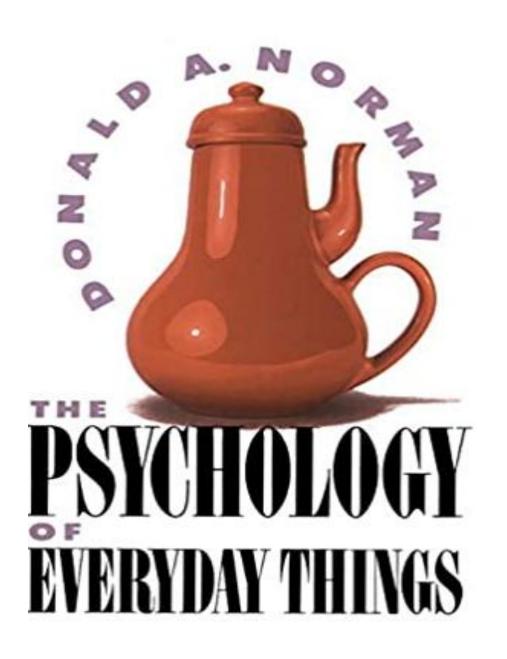PGS, Fall 2025
Keerati Chenpitayaton

Donald A.
Norman
(Don Norman)

- **Cognitive Psychologist Studying Human Thought/Information Processing**
- Observing How People Use Gadgets and Technologies in Everyday Life
  - ✓ Onsite Researcher Discovering Problems and Providing Solutions
- **Giving Scientific Authority to Design Professions (Quite New at that Time)**

The
Psychology
of Everyday
Things
(POET)
(1988)
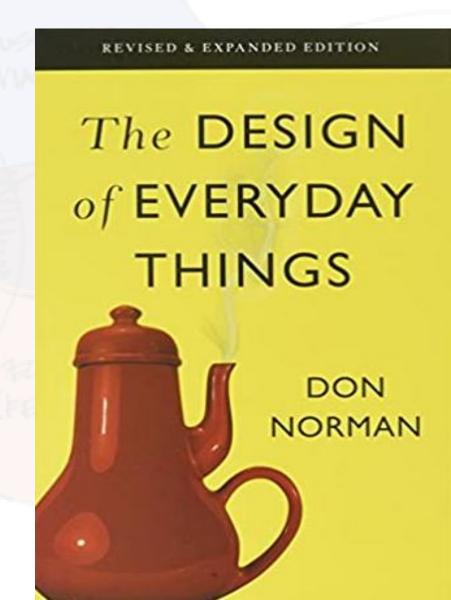
Norman's Classic Work

- **Assigned Reading**: Chapter 1: "The Psychology of Everyday Things" (pp. 1-36)
- **Recommended Chapters**: Chapter 2, 3, 4 (On Constraints) [Skim the Entire Book!]

REVISED & EXPANDED EDITION

The DESIGN of EVERYDAY THINGS

DON NORMAN

Preface to the Revised Edition (1)

- A Starter Kit for Good Design
- A Book for **Everyone**, for Everyday People, Technical People, Designers and Non-Designers
- To Turn Readers into the Great Observers of the Absurd, of Poor Designs that Give Rise to Many Problems for Modern Life and Technology
- To Turn Readers into the Observers of the Good, in which Thoughtful Designers Have Worked to Make Our Lives Easier and Smoother

Preface to the Revised Edition (2)

- "Good design is <u>actually a lot harder to notice than poor design</u>, in part because good designs fit our needs so well that the design is invisible, serving us without drawing attention to itself" (p. xi).

- "Bad design, on the other hand, <u>screams out its inadequacies</u>, making itself very noticeable" (p. xi).
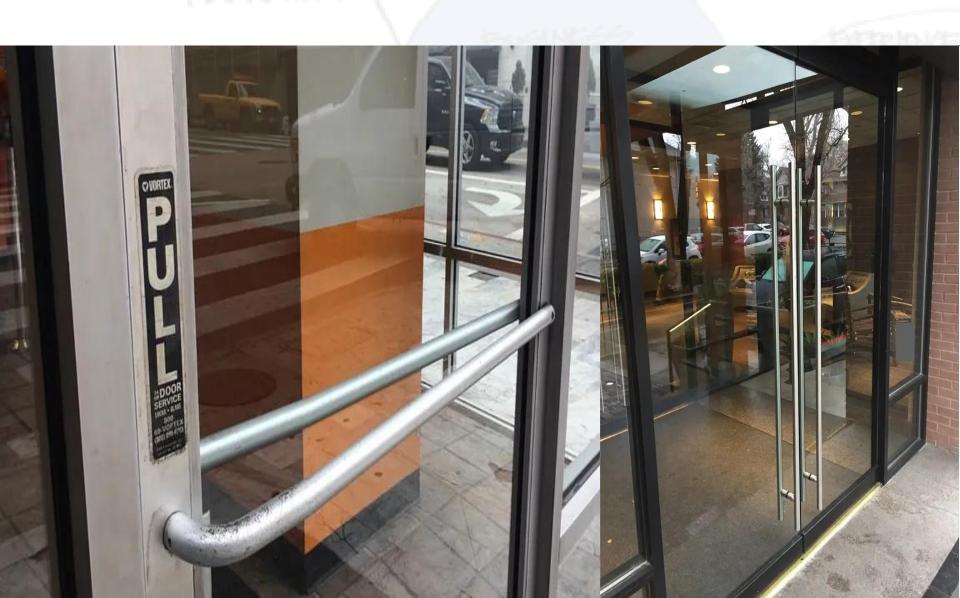
The "User-Centered" Perspective OR The "Human-Centered Design" (HCD)

"When people get frustrated and panicked with using gadgets and technologies, they tend to blame themselves."

"**Don't Blame Yourself (as the "Users");** **Blame the Designers (as the "Creators") and their products (as the "Poor Designs").**

Norman's Doors

Norman's "Two Most Important Characteristics of Good Design":
Discoverability and *Understanding*
(p. 3).

Discoverability

Is it possible to figure out <u>what actions</u> <u>are possible</u> and <u>where and how to</u> <u>perform them</u>? (p. 3)

Understanding

What does it <u>all mean</u>?
How is the product <u>supposed to be used</u>?
What do all the different <u>controls and</u>
<u>settings mean</u>? (p. 3)

Norman's
"Two Most Important Characteristics of Good Design":
Discoverability and *Understanding*
(p. 3)

Are all the relevant components visible?
(The Visibility of Interaction)

Do they communicate the correct message?
(The Clarity of Communication)

The Complexity of Modern Devices (pp. 4-8)

The Complexity of Modern Devices (1)

- All *artificial things* are designed.
- **Design of Everyday Things**: Thinking about the <u>Interplay between Technology and People</u>
- **Everyday Things**: Should Fulfill Human Needs, While Being Understandable and Usable
- **Everyday Things**: Could Be Delightful and Enjoyable If Designed Well

The Complexity of Modern Devices (2)

- Not only the products must meet the "requirements of engineering, manufacturing, and ergonomics," but the "attention must be paid to the <u>entire experience</u>, which means the <u>aesthetics of form</u> and the <u>quality of interaction</u>" (p. 4).

The Complexity of Modern Devices (3)

Industrial Design	The professional service of creating and developing concepts and specifications that optimize the <u>function, value, and appearance of products and systems</u> for the mutual benefit of both user and manufacturer.
Interaction Design	The focus is upon <u>how people interact with technology</u>. The goal is to enhance people's understanding of what can be done, what is happening, and what has just occurred. Interaction design draws upon principle of psychology, design, art, and emotion to ensure a positive, enjoyable experience.
Experience Design	The practice of designing products, processes, services, events, and environments with a focus placed on the <u>quality and enjoyment of the total experience</u>.

The Human-Centered Design (HCD) (pp. 8-10)

" ... **a design philosophy.** ... It means starting with a <u>good understanding of people</u> and the <u>needs that the design is intended to meet</u>. ... (p. 9).

The Human-Centered Design (HCD) (pp. 8-10)

Table 1.1. (p. 9) The Role of HCD and Design Specifications	
Experience Design	These are 3 areas of focus.
Industrial Design	
Interaction Design	
The Human-Centered Design (HCD)	The process that ensures that the <u>designs match the needs and capabilities of the people for whom they are intended</u>.

Norman's "Fundamental Principles of Interaction" (pp. 10-31): "Good designers produce pleasurable experiences. ..." (p. 10).

"Fundamental Principles of Interaction" (pp. 10-31):

5 Key Design Parameters

+ 1 (pp. 10-31)

I. Affordances

II. Signifiers

III. Constraints

IV. Mappings

V. Feedback

I. Affordances

What *actions* should be encouraged, supported, or facilitated?

II. <u>Signifiers</u>

Are there any **signs/signals** that <u>communicate where the actions should take place,</u> what **actions** <u>are possible and how they should be done</u>?

Affordances vs. Signifiers (1)

- **Affordances** are the possible interactions between people and the environment. <u>Some affordances are perceivable, others are not</u>. (p. 19)

- **Perceived affordances** often act as signifiers, but they can be ambiguous. (p. 19)

- **Signifiers** signal things, in particular what actions are possible and how they should be done. <u>Signifiers must be perceivable, else they fail to function</u>. (p. 19)

Affordances vs. Signifiers (2)

- <u>For Example</u>: Arrows and Icons on a Mobile Devices' Touch Screen Acting as Signifiers

- "<u>In design, signifiers are more important than affordances, for they communicate how to use the design</u>. A signifier can be words, a graphical illustration, or just a device whose perceived affordances are unambiguous. <u>Creative designers incorporate the signifying part of the design into a cohesive experience</u>. For the most part, designers can focus upon signifiers" (p. 19).

III. Constraints

What **actions** should be prevented, discouraged, or impeded?

On Constraints (Chapter 4)

- **FOUR General Kinds of Constraints:** Physical, Cultural, Semantic, and Logical (pp. 125-132)
- **FOUR Specific Kinds of Constraints that Force the Desired Behavior:** Forcing Functions, Interlocks, Lock-Ins, and Lock-Outs (pp. 141-145)

IV. Mappings

Are the **relationships** between <u>controls and desired actions</u> *clear*?

Natural Mappings (1)

- "Mapping" as an important concept in the design and layout of controls and displays (p. 21)

- "Mapping," a technical term borrowed from mathematics, means the relationship between the elements of the two sets of things. (p. 20)

- Utilizing spatial correspondence between the layout of the controls and the devices being controlled making the use easy to determine (p. 21)

- <u>For Example</u>: Steering a Car Using a Wheel

Natural Mappings (2)

- The relationship between a control and its results is easiest to learn wherever an understandable mapping between the controls, the actions, and the intended results exist. (p. 22)

- Some natural mappings are cultural (relative) or biological (universal).

- For Example: The Universal Standard of Moving the Hand UP to Signify MORE, Moving It DOWN to Signify LESS

- Many mappings feel "natural" but in fact are specific to a particular culture.

V. Feedback

Is it easy to <u>tell whether an intended action has been carried out</u>?

VI. Conceptual Models

... is an *explanation*, usually <u>highly simplified</u>, of <u>how something works</u>. It doesn't have to be complete or even accurate as long as it is useful. ... (p. 27).

<u>For Example</u>: Files, Folders, Icons in Computers (Only Conceptions Existing in the "Cloud")

<u>For Example</u>: Technical Manuals and Books for Technical Use

Conceptual models can be <u>inferred from the devices</u> themselves or <u>come from instruction manuals</u>.
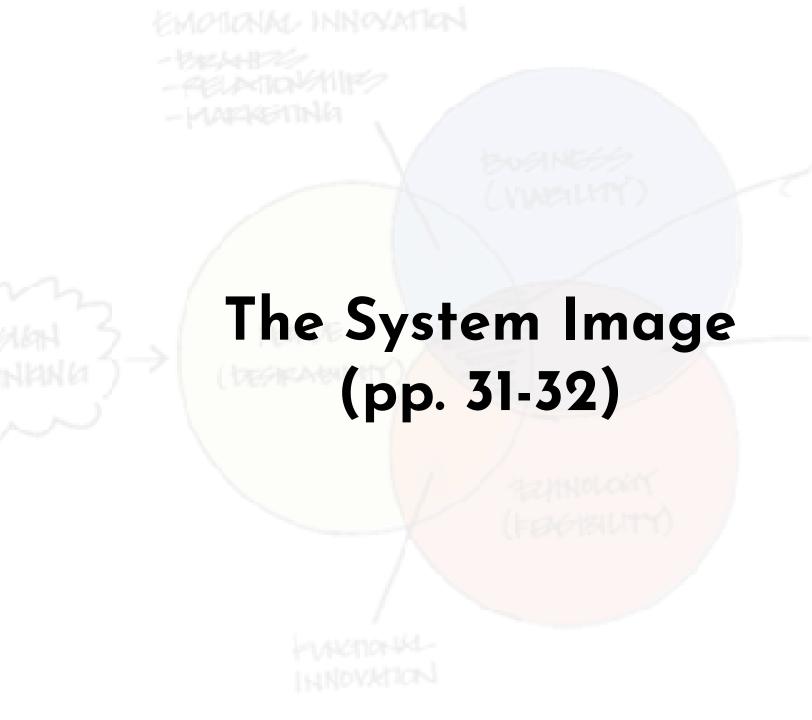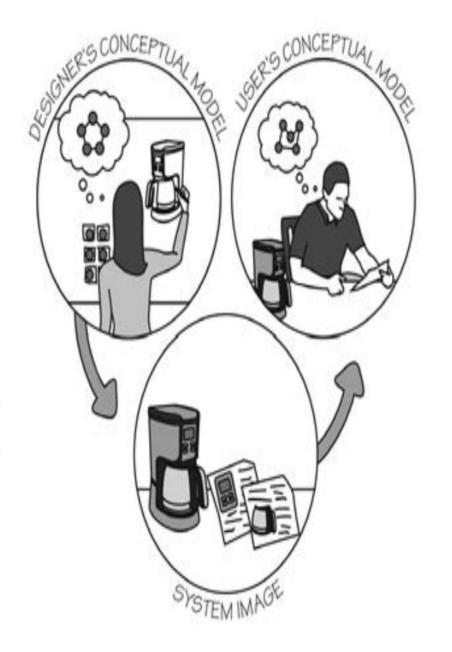
The System Image
(pp. 31-32)

FIGURE 1.11. The Designer's Model, the User's Model, and the System Image. The designer's conceptual model is the designer's conception of the look, feel, and operation of a product. The system image is what can be derived from the physical structure that has been built (including documentation). The user's mental model is developed through interaction with the product and the system image. Designers expect the user's model to be identical to their own, but because they cannot communicate directly with the user, the burden of communication is with the system image.

The Paradox of Technology (pp. 32-34)

The "Paradox of Technology" (I)

- "Technology offers the potential to make life easier and more enjoyable: <u>each new technology provides increased benefits</u>. At the same time, <u>added complexity arises to increase our difficulty and frustration</u> ..." (p. 32-34).

The "Paradox of Technology" (II)

- "... The same technology that simplifies life by providing more functions in each device <u>also complicates life by making the device harder to learn, harder to use</u>. This is the <u>paradox of technology</u> ..." (pp. 32-34).

The "Paradox of Technology" (III)

- "The paradox of technology should never be used as an excuse for poor design. It is true that as the number of options and capabilities of any device increases, so too must be the number and complexity of the controls. But the principles of good design can make complexity manageable" (pp. 32-34).

Norman's "Good Designs"

NO Best Solutions for Good Designs; Good Designs Are NATURAL Designs.

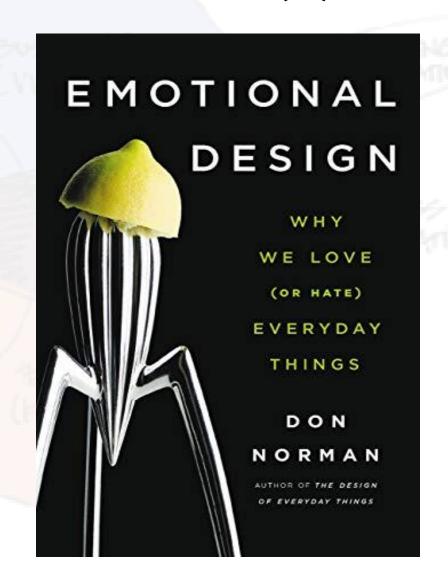# Norman's "Principles of Good Design":
Providing <u>Criteria to Judge What Are "Good" or "Bad" Designs</u> (What succeeds, what fails!)
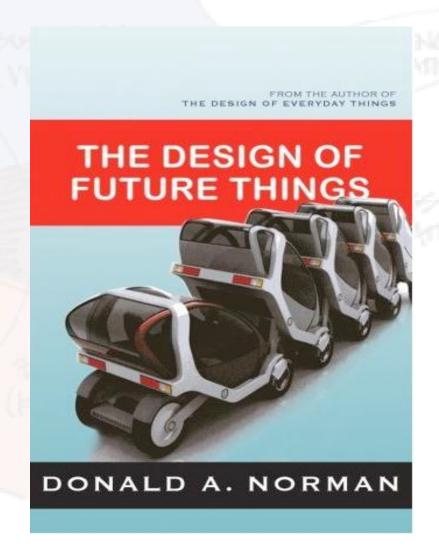
Critiques of Norman's (I)

- Presenting a Robotic Image of Human Beings; Human Beings as Objects Who Act According to Their Pre-Programmed Cognitive Functions

- NO Subjective Aspects (Emotional, Philosophical, and Spiritual Dimensions)

EMOTIONAL DESIGN

WHY WE LOVE (OR HATE) EVERYDAY THINGS

DON NORMAN

AUTHOR OF *THE DESIGN OF EVERYDAY THINGS*

Critiques of Norman's (II)

- Only Dealing with Pre-Digital Technology
- Only Dealing with Gadgets
- Harder to Apply to Large-Technological Systems

FROM THE AUTHOR OF
THE DESIGN OF EVERYDAY THINGS

THE DESIGN OF FUTURE THINGS
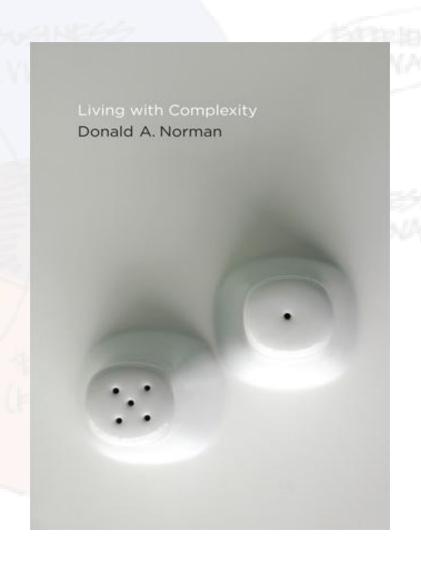
DONALD A. NORMAN

BAD Human Factors Designs

- A Scrapbook Full of Illustrated Examples of Things that Are Hard to Use Because They Do NOT Follow Human Factors Principles.

- http://www.baddesigns.com/

Norman's Latest Work

- **Recommended Reading**: Chapter 6: "Systems and Services"

- **Other Recommended Chapters**: Chapter 1, 2, 3, 4, 8
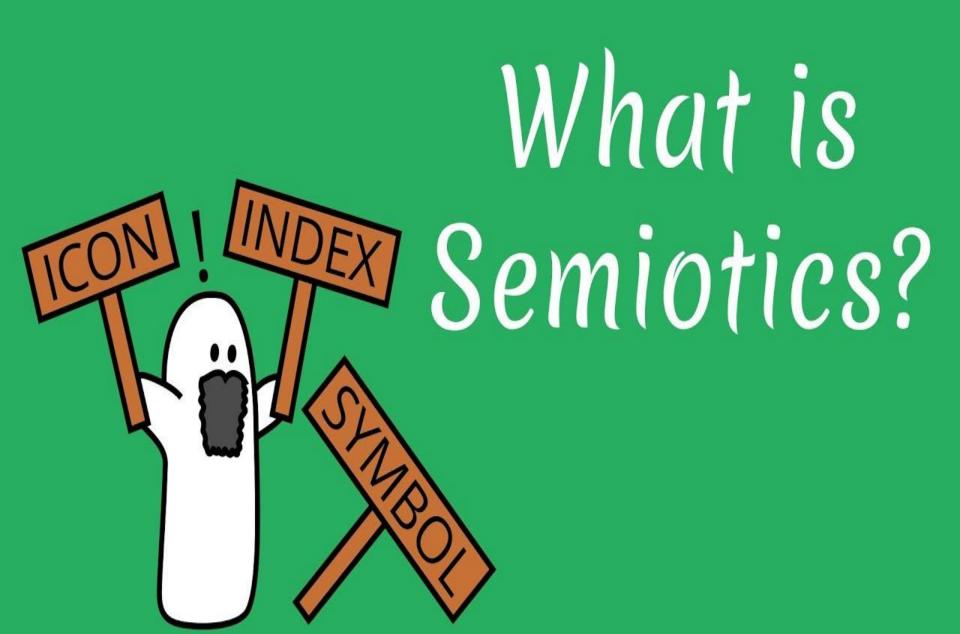
Living with Complexity
Donald A. Norman

"Social Signifiers" (Chapter 3)

- People's Action Have Side Effects, Leaving Their Traces and Trails of Their Activities that Enable Us to Retrace Their Steps.

- Most Are Done without Conscious Awareness.

- **Side Effects = Social Signifiers (Social Signals)**

- "A 'Signifier' Is Some Sort of Indicator, Some Signal in the Physical or Social World that Can Be Interpreted Meaningfully."

"Social Signifiers" (Chapter 3)

- **Social Signifiers** = Signaling Systems (How the World Tell Us What to Do!)
- **Semiotics** = Academic Field Devoting to the Study of "Signs" within Society
- **Signifier** = An Important Communication Device to the Recipient Whether or Not the Communication Is Intended

"Cultural Complexity" (Chapter 3)

- Good Designers <u>Think about Cultural Complexity and Provide Clues (or Social Signifiers) as to Appropriate Use</u>.

- **Empathy =** Ability to Place Oneself in the Position of Those Who Use One's Designed Products and Then Provide the Information Required for Proper Usage, <u>BUT without Destroying the Aesthetic Beauty or the Functions, or Increasing the Cost</u>

"Cultural Complexity" (Chapter 3)

- "**That's the Design Challenge**: Managing the Tensions."

- **Less Emphatic Designers** → Focusing Only on Two Aspects: 1) Appearance and 2) Cost
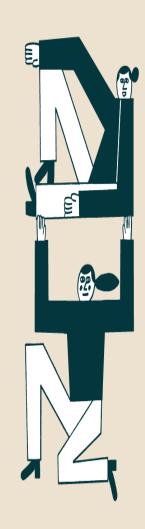
"Cultural Complexity" (Chapter 3)

- **Social Synchronization** = Requiring Everyone to Have and Share the Same Knowledge

- **Several Reasons WHY We Have So Much Difficulty with Our Technology**

1) To Understand How We Function in the World We <u>Must Understand How We Interact with One Another</u>.

2) In the Real World, Where So Much Is Unknown or Uncertain, <u>Where So Much Is Not Under Our Con</u>trol, the Best Tactic Is Usually "Proceed with Caution." If Possible, Do an Experiment.

3) <u>Good Design Can Make the Entire Problem Disappear</u>.

"Cultural Complexity" (Chapter 3)

- **Alternative Designs** = Adding *Sociability* to Devices, <u>Putting the Knowledge in the World</u>, <u>Making Operation Self-Explanatory</u>

"Systems and Services" (Chapter 6)

- **Interaction Design** Is Now a Major Component of Almost All Designs.

- From Understanding and Usability the Field Expanded to Incorporate <u>Emotional Factors</u>, toward a Focus on Experience and Enjoyment.

"Systems and Services" (Chapter 6)

- "The world of services is different from that of products, in part because they have not been studied as much as products. Although one would think that service providers should also adhere to the standard themes of good interaction design, that is, good feedback along with coherent conceptual models, in practice it is not so simple."

"Systems and Services" (Chapter 6)

- **Services Are <u>Often Complex</u>.** → Immense Bureaucratic Rules and Regulations, Hordes of Back-Office People, and Often Multiple Divisions of a Company All Having Some Say in Responses to Any Question that Is Not Routine.

- **Frontstage or Onstage** = "As individuals, all we see is the front end of the service, the visible part exemplified by the person, mailing address, telephone contact, or Wed site that is our source of interaction." → Parts Visible to the Customers

"Systems and Services" (Chapter 6)

- **Backstage** = "All that stuff behind the scenes—those mysterious operations that give rise either to smooth, efficient operations or to confusing, mindless ones—is called the 'backstage'." ➔ All Activities that Occur out of Sight of the Customer

- **Frontstage** vs. **Backstage** Components ➔ NOT a Neat Separation

- "Everything has a front and back, so each of the backstage components has its own front and back."

"Systems and Services" (Chapter 6)

- **Services Are <u>Recursive</u>.**

- Design of Modern Systems and Services Must Cope with This Recursiveness, with the Fact that What Is to Be Designed Depends on the Point of View of All Parts/Parties. **=** **"Wicked Problems"**

- **<u>Internal Backstages of Services</u> Are Critically Important.** = The Operations and Technologies Side
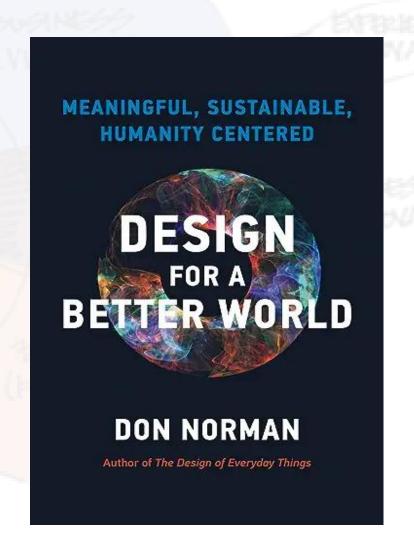
"Services as Systems" (Chapter 6)

- **Services = Social and Complex Systems**

- **Services** =Provided by Large Organizations with Components in Very Different Geographical Locations

- Quite Often the Different Parts of the Organization Do Not Understand or Communicate Well with One Another.

- Many Services Involve Different Organizations, and Communication among Them Is Difficult.

"Designing the Experience" (Chapter 6)

- **Services = Experiences to Individual Customers or Employees**
- As Much Well-Being and Comfort Must Be Given to the Employees as the Customers
- The Secrets to Effective Design Lie with the <u>Management of People, Not with Technology</u>.
- "Web sites count as services, and so the very same lessons apply. …"

Norman's Other Latest Works

Group Exercise: Week 4

The Ideas of Design:
The User-Centered Perspective and the Human-Centered Design (HCD)

Social Theory &
Design Thinking (2410302)
PGS, Fall 2024
Keerati Chenpitayaton

TASK (I)

- In *The Design of Everyday Things*, Norman calls attention to a "paradox of technology": added complexity and difficulty cannot be avoided when functions are added, but with clever design, they can be minimized." (pp. 32-34).

- To propose minimizing complexity and difficulty as design values is to advocate for a **Human-Centered Design (HCD) or user-centered design practice**.

TASK (II)

- Assume that you are part of a team hired to work on the following projects. Your task is to try to answer Norman's call to <u>minimize complexity and difficulty</u> by thinking about your project in terms of Norman's <u>key design parameters</u>: *Affordances*, *Signifiers*, *Constraints*, *Mappings*, and *Feedback*.

- With your group members, brainstorm some aspects, factors, or elements of your assigned project, using the five categories and their associated questions as prompts (see below).
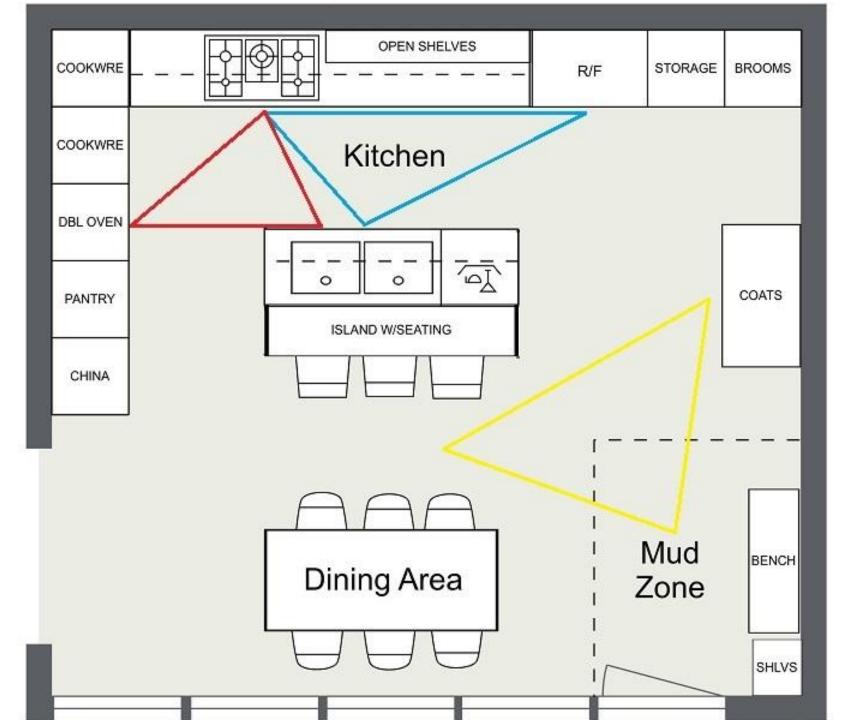
TASK (III)

- When you have reached consensus on some of the relevant factors of your design project, use the margins of this handout, or a separate sheet of paper, to sketch some ideas for <u>how your design would make visible the Human-Centered Design (HCD) or user-centered characters indicated by the five categories (parameters)</u>.

- **Each group is asked to do TWO problems:** By choosing only ONE problem from #1 to #12 PLUS ANOTHER ONE problem: #X.

Norman's 5 Key Design Parameters

- **Affordances**: What actions should be encouraged, supported, or facilitated?

- **Signifiers**: Are there any signs/signals that communicate where the actions should take place, what actions are possible and how they should be done?

- **Constraints**: What actions should be prevented, discouraged, or impeded?

- **Mappings**: Are the relationships between controls and desired actions clear?

- **Feedback**: Is it easy to tell whether an intended action has been carried out?

#1

- Design the <u>floor plan</u> for a combined kitchen, dining area, living room, and Work From Home (WFH) office space for clients who cook, work, and entertain frequently.

COOKWRE

OPEN SHELVES

R/F

STORAGE

BROOMS

COOKWRE

Kitchen

DBL OVEN

PANTRY

CHINA

ISLAND W/SEATING

COATS

Dining Area

Mud Zone

BENCH

SHLVS

#2

- Each group member: describe your <u>cell phone</u>, using the criteria below. What do you like and dislike about your phone and the way it works? Compare your reactions and notes with the other group members'. What design parameters emerge regarding ways that the functionality of cell phones might be improved?
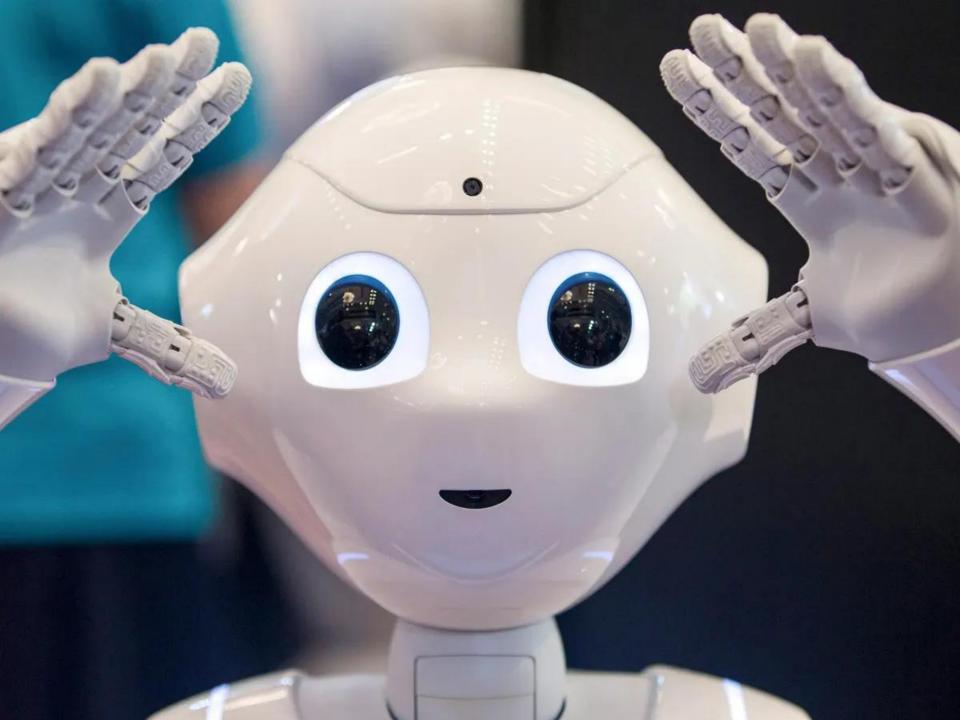
#3

- Re-design an <u>airliner's unisex bathrooms</u> to be both easier for older customers, safer for small children, and people with disabilities to use.

#4

- Taking advantage of the latest technology, update the design of a <u>car's dashboard</u> as part of an effort to make the car more attractive to younger consumers, while promoting environmental consciousness and safety.

サードシート
を固定
して下さい

INCC

km/h

x1000r/min

20 40 60 80 100 120 140 160 180

0 1 2 3 4 5 6 7

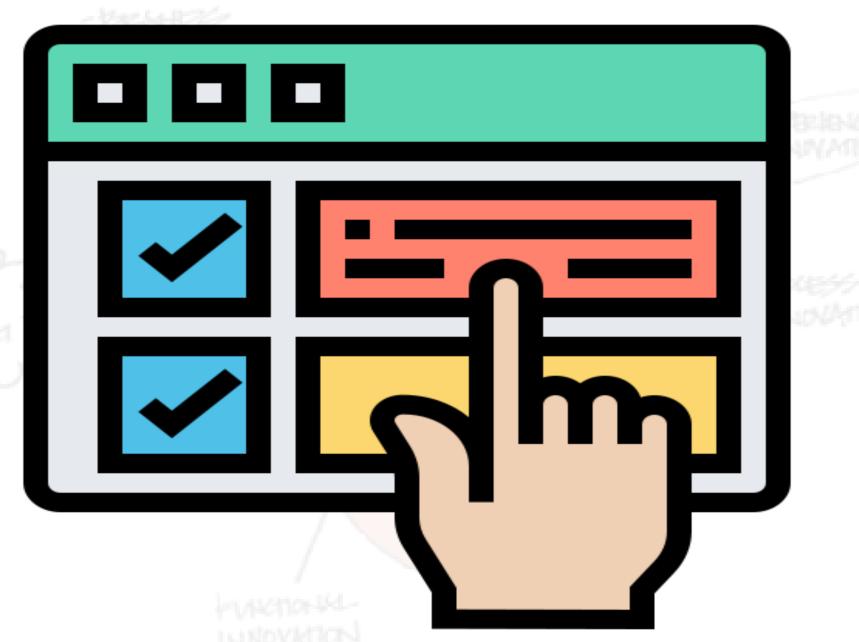P R N D Dₛ M 7

F H C

#5

- Design a <u>humanoid robot</u> that can work in a university's campus as part of the university's current policy to boost its competitive edge and global ranking, at the same time, trying to combat social inequality (such as unemployment, etc.) that might follow from using such technology.

#6

- Design a <u>User Interface (UI)</u> of a vending machine (photo booth) that takes photographs for your identification cards, passports, or simply just for fun, such that this photo booth can be placed in any office buildings, university campuses, shopping malls, public transportations' stations, or public events' venues.
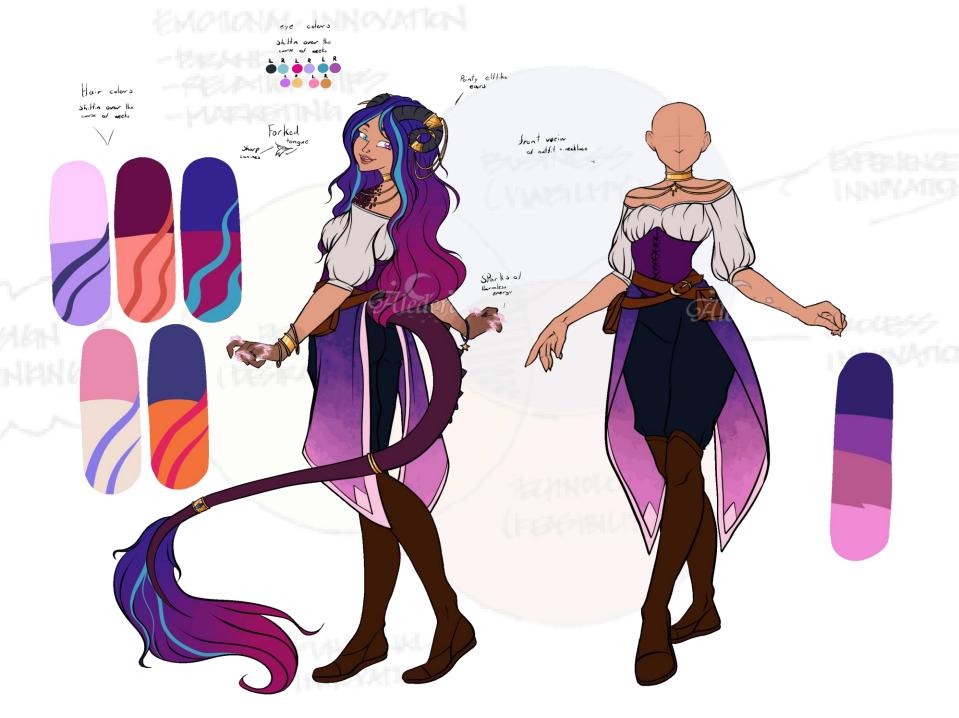
#7

- Choose an <u>existing packaging of any everyday product</u> that you think does not work well according to Norman's key design parameters. Re-design it to enhance its users' experience.

#8

- Bangkok is becoming a creative city. Design a <u>public space</u> that people (and their pets) can walk, work, play, and perform their free-time activities in sustainable ways.

#9

- If you were to redesign an <u>apparel or outfit</u> that is suitable for the extreme weathers due to the current climate crisis without falling behind the relatively recent fashion trend or style, how could Norman's key design parameters help you achieve this goal?

EMOTIONAL INNOVATION

eye colors
shiftin over the course of weeks

Hair colors
shiftin over the course of weeks

Forked tongue

Sharp canines

Pointy elf-like ears

Front view of outfit + necklace

Sparks of harmless energy

#10

- Compare two <u>subway train stations</u> from either the different cities or different providers within the same city, according to the experiences you have encountered, using Norman's key design parameters.

#11

- Design a <u>wearable digital technology</u> that can inform you about your health condition, weather forecast, crime prediction, spatial navigation, etc.

#12

- Design a <u>workshop studio</u> capable of hosting a real-time and virtual classroom, laboratory experiment, and augmented reality for field trips and long distant experiences.

#X

- Create your own design project for a <u>Mobile App (mobile phone's application)</u> and discuss it using Norman's key design parameters, OR choose a <u>Mobile App (mobile phone's application)</u> that already exists, that which your team thinks it fails or functionally poor; then, critique it using Norman's key design parameters. Use your imagination!

Next Week's Theme:
Week 5: *Design & Self*

The meaning of things

Domestic symbols and the self

Mihaly Csikszentmihalyi & Eugene Rochberg-Halton

Evocative Objects

Things We Think With

edited and with an introduction by Sherry Turkle