



# Designing Basics [Develop]

“Keeping the same art style and setting. Create an image set in the pacific northwest forest where some baby animals are sitting together thinking up of new design ideas.” ChatGPT

# Today: Designing for HCD

- Lecture:
  - Mental models
  - Norman's Gulfs
  - Design Principles

# Applications should be intuitive



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# Mental models

- What user believes about the system.
  - Based on prior knowledge, prior interactions, advertisement
  - Predict how a system works → how they interact

## Scenario: Warm Evening

Alex returns home from their theater performance on a hot evening and finds the living room uncomfortably hot.

In an attempt to cool the room quickly, Alex sets the thermostat to 45F, even though a comfortable temperature would be around 70F.

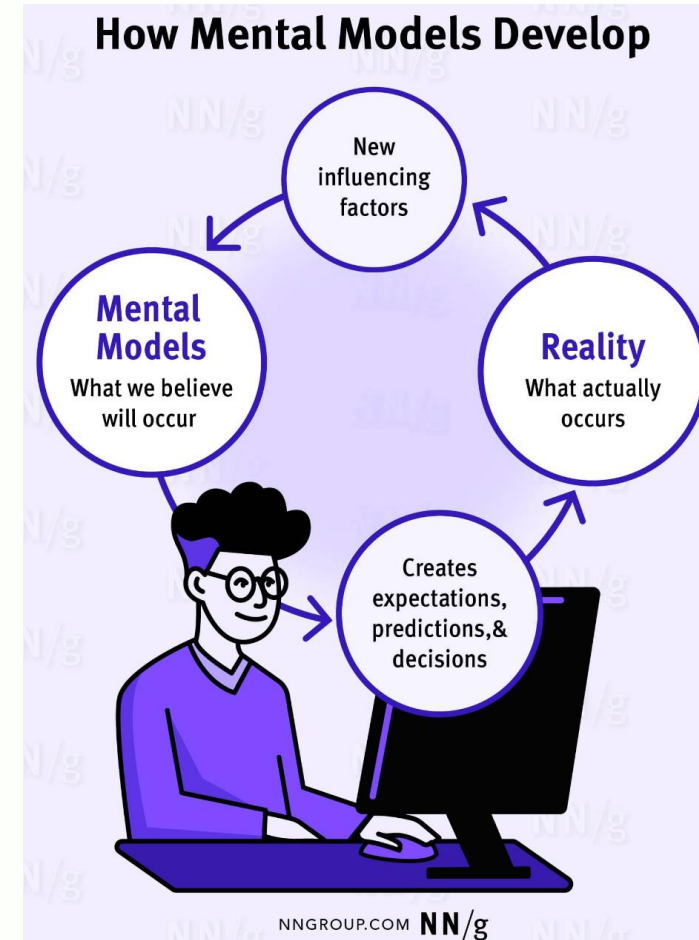
Is that the right process?

What is Alex's mental model?



## Recall: Mental models

- Are based on Belief, not Facts
  - Unique to each user
  - Change over time
  - Has inertia to change
- 
- Does it meet expectations?
  - Does it match the intended design?





# Reduce Mental Model Gap

- Make the system conform
- Improve users' mental model
  - Labels
  - Instructions
  - Training (tutorial, demo, ...)
  - **Metaphors**



# Thermostat Mental Model

## Faulty Mental Model (Faucet Metaphor):

Its **not** a **water faucet**—turn it up more and *more heat flows faster*, like turning a faucet wider to get more water.

## Better Metaphor: Oven Timer or Target Tracker

The thermostat is more like **an oven timer** or a **GPS target tracker**—you set the *destination* (temperature), and the system works steadily to get there.


Turning the thermostat higher doesn't make it arrive faster



amazon prime Deliver to Anita Brownsville 97327 All Search Amazon Q Hello, Anita Account & List Cart

Big Spring Sale Medical Care Groceries Prime Video Amazon Basics Buy Again Today's Deals Keep Shopping For Big Spring Sale ends

**Electronics** Cell Phones & Accessories Cell Phones Accessories Cases Wearable Technology Deal:

 **WHOOP 4.0 12-Month Health Tracker (Sleep, Strain, Recovery)** 4 ★★★★★ 2,029 \$239<sup>00</sup> ✓prime

Sports & Outdoors › Exercise & Fitness › Fitness Technology › Activity & Fitness Trackers



**Added to cart**

Color: Black/Midnight Zen

**Cart Subtotal: \$69<sup>95</sup>**

**Proceed to checkout (1 item)**

**Go to Cart**



**Amazon's Choice**

10K+ bought in past month

**Big Spring Deal**

**-30% \$69<sup>95</sup>**

List Price: \$99.95

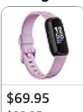
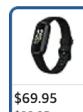
Or **\$11.66** /mo (6 mo). Select from 3 plans

✓prime

**FREE Returns**

May be available at a lower price from [other sellers](#), potentially without free Prime shipping.

Color: **Black/Midnight Zen**



\$69.95

\$69.95

\$79.95

**In Stock**

Quantity: 1

**Add to cart**

**Buy Now**

- ☐ 2-Year Protection Plan for \$9.99
- ☐ 3-Year Protection Plan for \$11.99
- ☐ Amazon Complete Protect

**What metaphors can you spot?**

## 2. 🏷️ "Big Spring Deal" and "List Price \$99.95 → \$69.95"

- **Metaphor:** In-store sales tags/price markdowns
- **Mental Model Support:** Maps to how we understand discounts in brick-and-mortar stores (e.g., red sale signs).
- **Goal:** Creates urgency and perceived value.

## 3. 📦 "FREE delivery," "In Stock," and "Ships from Amazon.com"

- **Metaphor:** Warehouse/order fulfillment model
- **Mental Model Support:** Reinforces that users are dealing with inventory like in a physical logistics system.
- **Goal:** Builds trust and expectation of prompt delivery.

## 4. 🔄 "Buy Again"

- **Metaphor:** Repeat purchase behavior
- **Mental Model Support:** Mimics going back to a favorite store to pick up the same item again.
- **Goal:** Makes reordering cognitively easy and fast.

## 5. ★ Star Ratings

- **Metaphor:** Hotel/movie star reviews
- **Mental Model Support:** Lets users quickly gauge product popularity/quality using a widely understood metric.
- **Goal:** Social proof to encourage buying.


## 6. 🔔 "Set reminder" (for price tracking)

- **Metaphor:** Alarm clock or personal assistant reminder
- **Mental Model Support:** Like setting a reminder on your phone or calendar.
- **Goal:** Helps retain customer interest even if they're not ready to buy.

These metaphors:

- Create **intuitive expectations** for interaction.
- Reduce the **gulf of execution** (users know what actions to take).
- Improve **learnability** and **efficiency** in navigation and decision-making.

# What's wrong with this picture?

 NOMAD LANE

Bags


Accessories

About Us

Reviews


Blog

Help



×

MY BAG (2)



v4 Bento Bag® - Personal Item Bag


\$248.00

-

2

+

REMOVE



Navidium Shipping Protection

from Damage, Loss & Theft for \$8.25

Get peace of mind with Delivery Guarantee in the event your delivery is damaged, stolen, or lost during transit.

☒

SUBTOTAL

\$504.25

CHECKOUT

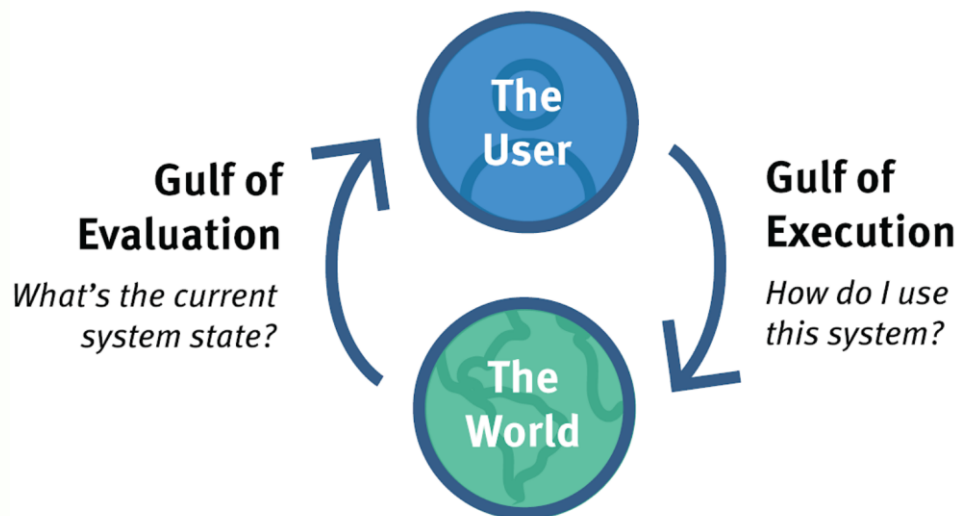
[VIEW SHOPPING BAG](#)

<https://www.nngroup.com/articles/mental-models/>

# The 2 UX Gulfs

Challenges people need to overcome to successfully interact with the system:

- Gulf of Evaluation – Understanding the state of the system
- Gulf of Execution – Taking action to accomplish a specific goal



## **Gulfs caused by:**

Breakdowns in:

### **Evaluation:**

- Perceiving the system-status indicator
- Interpreting what it means

### **Execution**

- Planning an action based on understanding
- Manipulating the controls

**Successful execution usually depends on correct evaluation**

## How to bridge these gulfs- make things intuitive?

- What are the gulfs with this interface?
- How would you do it? Design your solution.

On your own [5 min]



“Google Nest Pro Thermostat E is for Everyone. It’s beautifully designed to blend right into any home. The frosted display shows you the temperature when you’re close, and fades into the background when you walk away.”



## Design Principles:

1. Visibility of user' s options/actions.
2. Feedback
3. Constraints
4. Consistency
5. Affordance

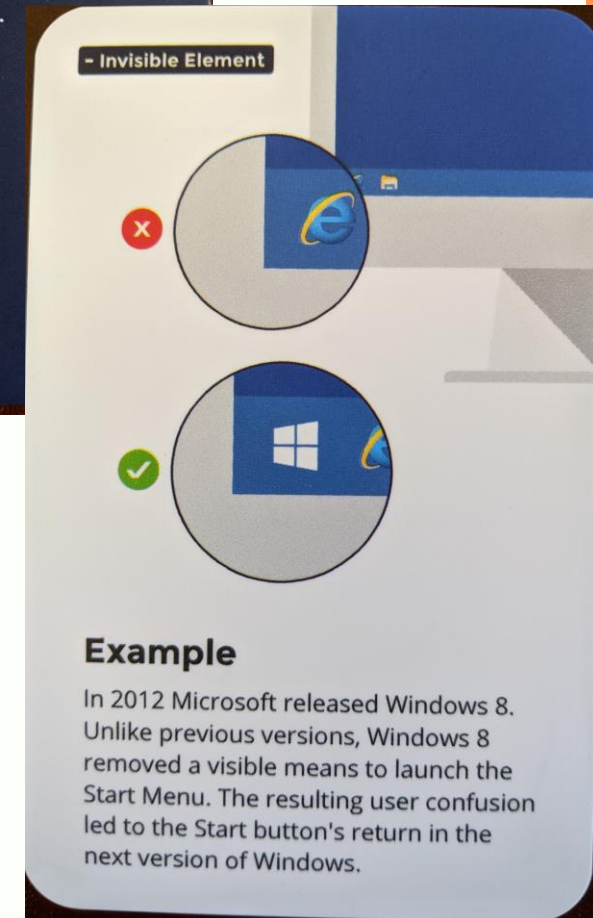
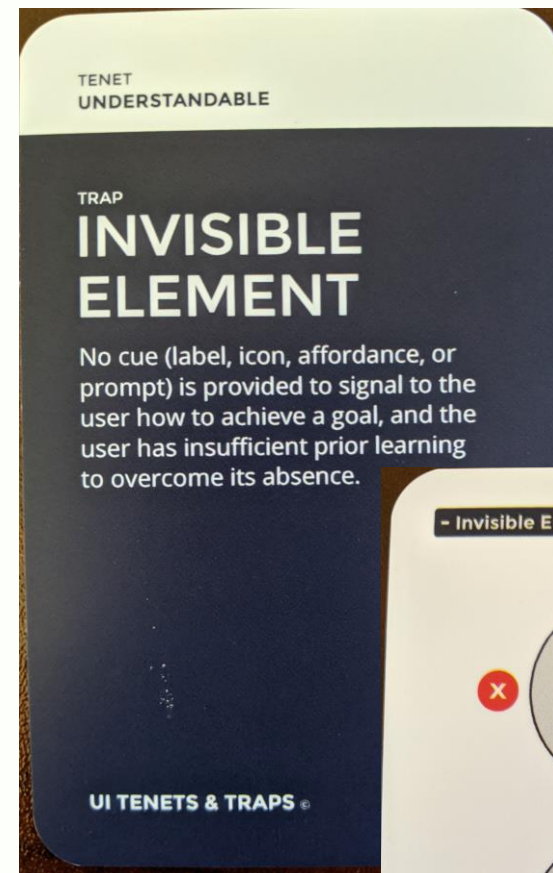
# Visibility

What options or actions are available

Examples:

- Good: Car controls
- Bad: Trap Card 1

Bridges gulf of ?



# Feedback

What happens when you taken an action

Examples:

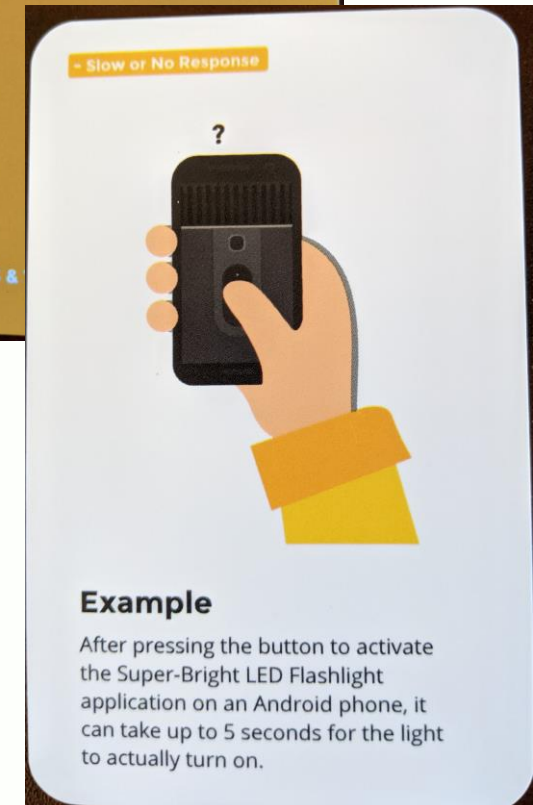
- Good: Cutting bread, writing with a pen – no lag in feedback
- Bad: Trap Card 12

Bridges gulf of ?

**Costly click: Man accidentally buys 28 Tesla cars online worth 1.4 million euros**



**HTAuto**  
DRIVE YOUR PASSION



# Constraints

Making some errors impossible

Examples

- Good: Greying out some options, templates for phone, menus instead of cmd to prevent syntax errors
- Bad: Trap card 11

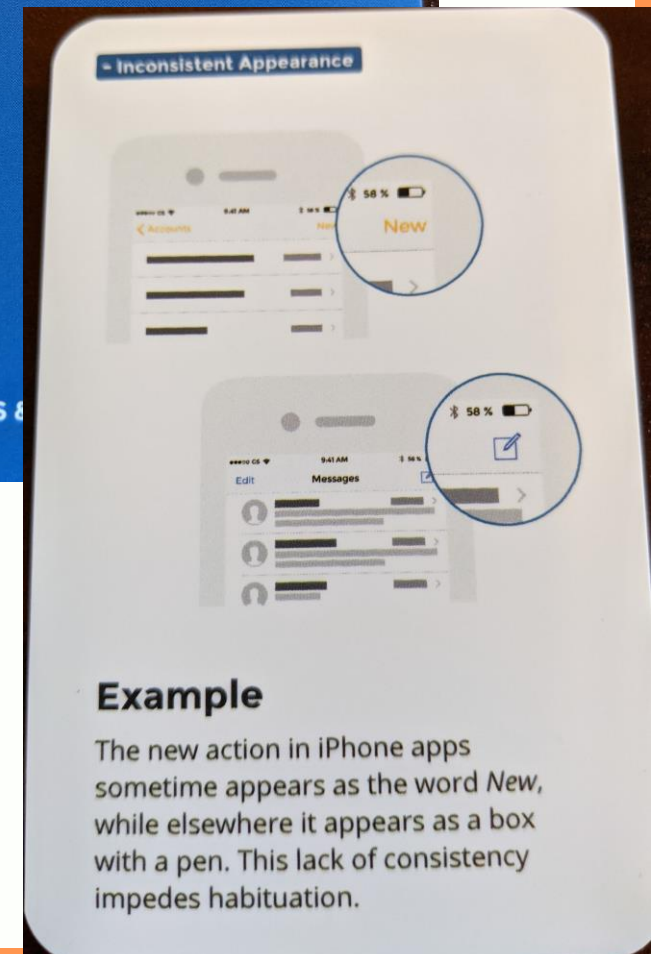
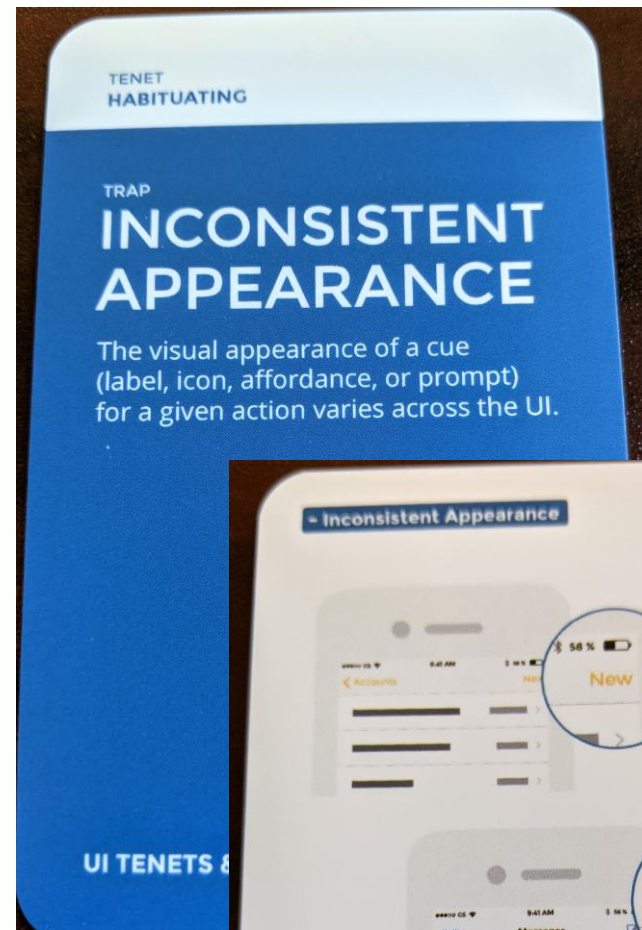
Bridges gulf of ?



# Consistency

- Internal: within your system
- External: with other systems and the physical world
- Examples
  - Microsoft suite: Word <-> power point, etc.
  - Bad: Trap card 24

Bridges gulf of ?

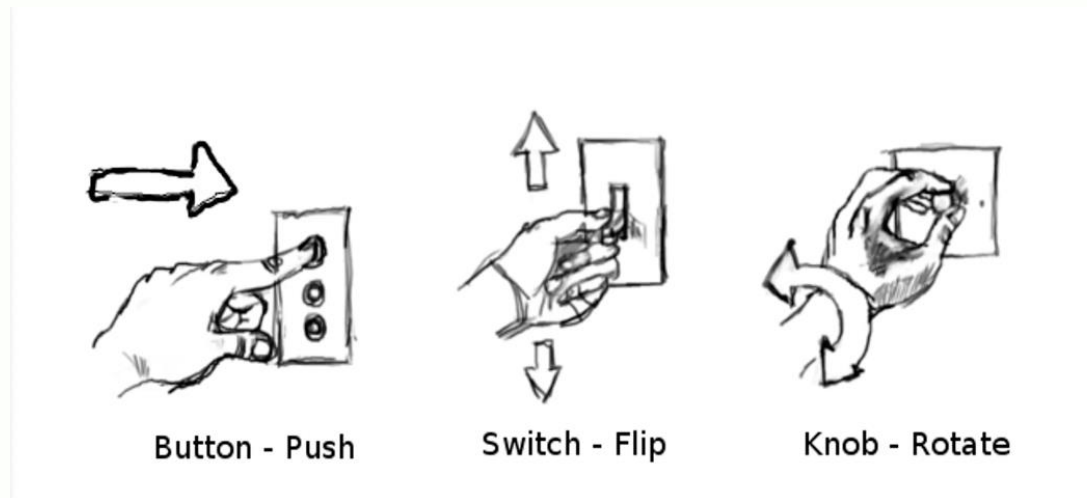


## Example

The new action in iPhone apps sometime appears as the word *New*, while elsewhere it appears as a box with a pen. This lack of consistency impedes habituation.

# Affordance

- Match between what an object *can do* and your *capability*
  - *Anti-affordances: DND, Apple Focus*
  - *Hidden affordances: You just don't know its possible*



Affordances feed into system functionality: level of control on light?



## Affordance (a bit more)

- Signifiers: Communication of *what actions are possible* and *how they should be done*; If signifiers are not perceived, they fail to function.



# Design Principles

1. Visibility of user's options/actions. [Gulf. Eval]
2. Feedback [Gulf. Eval]
3. Constraints [Gulf. Exe]
4. Consistency [Gulf. Eval]
5. Affordance [Gulf. Exe]

There are trade-offs

- More constrain, less visible
- More affordance/visible, more clutter
- More consistency/ sometimes less usable

...

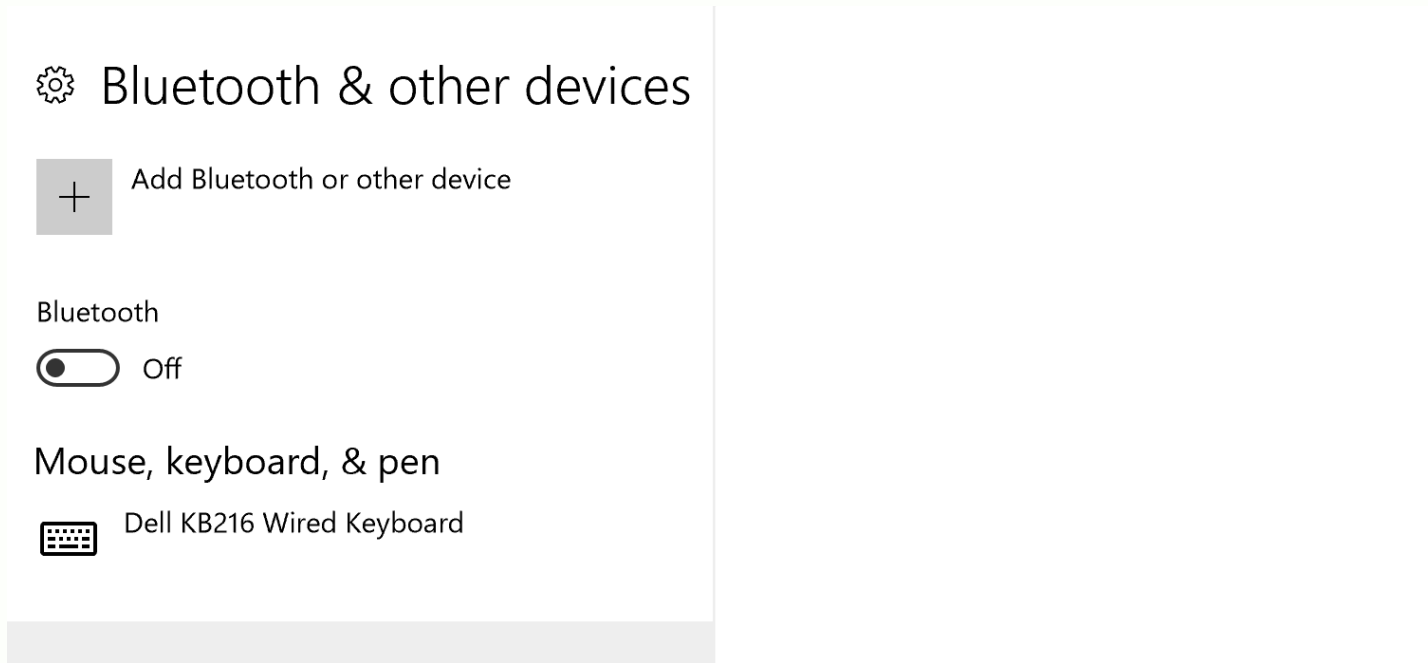


# You will use Design Principles

- In class for:
  - Designing your interface and interactions
  - Evaluating teams in “design gallery”, next week
  - Next: Activity

# Next Class: Ideation

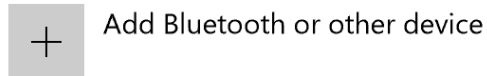
# Connect Bluetooth [x] to computer



Where do you think are the challenges a non-techie user may face in this example?

# The two UX Gulfs

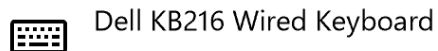
## Bluetooth & other devices



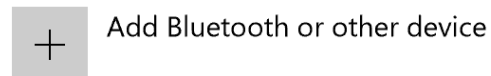
Bluetooth



## Mouse, keyboard, & pen



## Bluetooth & other devices



Bluetooth



Now discoverable as "DESKTOP-ISFRCAL"

## Mouse, keyboard, & pen

