Affordances
The Design Challenge

“Don’t Make Me Think”, Steve Klug
What is an Affordance?

- “To afford” means to offer, yield, provide, give, furnish, help, or aid

In HCI/UX, an affordance is something that helps, aids, or makes it possible for a user to do something

Psychologist James Gibson, “Theory of Affordances”, 1977 article
Semantic and Articulatory Distance

- **Semantic Distance**
  - *Mental distance* between what people *want to do* and the *meaning* of interface elements
  - (Conceptual and semantic levels)

- **Articulatory Distance**
  - *Mental distance* between an interface element’s *physical appearance* and what it actually *means*
  - (Semantic and syntactical levels)
Affordance Signifiers in UX Design

- **Cognitive** - content and meaning
- **Physical** - manipulation characteristics
- **Sensory** – appearance

- Functional - software functionality connection
- Emotional - potential for emotional impact

- Affordances work together
CAN YOU MAKE THAT LINK BUTTON BLUE INSTEAD OF BURNT ORANGE?

YES, IF YOU WANT FEWER PEOPLE TO CLICK ON IT, AND YOU THRIVE ON BAD DESIGN.

I HAVE AN EYE FOR DESIGN. AND I HAVE AN ELBOW FOR MUSIC.
Affordance - Cognitive Signifiers

- A design feature that **facilitates or enables** users to do their **cognitive actions**
  - Thinking
  - Deciding
  - Learning
  - Understanding
  - Remembering
  - Knowing about things

- **Precise words** and **symbols** for communicating
  - E.g., clear precise error messages
Affordance - Physical Signifiers

- A design feature that **facilitates** or **enables** users to do their **physical actions**
  - Clicking, touching, pointing, gesturing, and moving things
  - In non-computer designs, it is about handles, levers, gripping, turning, moving things
  - E.g., **button size and location**

- Design issues
  - **Physical characteristics** of interaction **devices**
  - **Physical disabilities**
Physical Objects
Digital Objects

Are you sure you want to delete this album?

Are you sure you want to delete this album?

Submit

Passbook

Safari

Shazam

Siri

Twitter

Vine

Weather
Affordance - Sensory Signifiers

- A design feature that **facilitates** or **enables** users to **sense things**
  - Seeing, hearing, feeling (and tasting and smelling) something
- Used in **supporting role** to help user **sense cognitive and physical affordances**
  - Visibility and legibility of text
  - Audibility of sound
  - Devices associated with haptic/tactile sensations
- Example, **legibility of button label text** supported by
  - Adequate **size** font
  - Appropriate **color contrast** between text and background
Functional and Emotional Affordances

- Functional – link usability to usefulness
  - Physical user **actions invoke system** (back-end) functionality
  - Add purpose to physical affordance
    - For example, it’s the reason a users clicks on a button
- Emotional -
  - A design feature that **facilitates** or **enables** a quality **emotional impact**
  - Derived from the **cumulative impact** of how well the **other affordances** succeed
    - Example, the ambiance inside Ikea stores
Example

- Affordances in the design of a “sort” button
  - First question – is the **functionality useful**?
  - **Cognitive** affordance
    - Clear and unambiguous label
    - Context to let the user know when it is appropriate to use it
  - **Physical** affordance – button size and location relative to other objects
  - **Sensory** affordance – in support of cognitive and physical affordances – text size and font, button shape, color, background contrast
User Created Affordances -> Design Defects

STATIONERY:
UPSIDE-DOWN,
FACE UP
Fitts’ Law

- Model of human movement
- The time taken to hit a target (e.g. a button, menu or icon on screen) is a function of the size of the target and the distance that has to be moved to the target
  - A larger target is easier to hit than a small one
  - A close target is easier to hit than a distant one
Fitt’s Law

- Time $T$ to move your hand to a target of size $S$ at distance $D$
  
  $T = RT + MT$

  - $RT$ is \textit{reaction time} (get hand moving), and
  - $MT$ is \textit{movement time}

  \begin{equation}
  MT = a + b \log(D/S + 1)
  \end{equation}

  Where $\log(D/S + 1)$ is the index of difficulty
Fitts’ Law Demo

Fitts Law Simulator

- Basis: physiological feedback loop
  1. **Perceptual processor** perceives hand location
  2. **Cognitive processor** compares to target location to determine remaining distance
  3. **Motor system** corrects to move remaining distance (may overshoot)
Implications of Fitts’ Law

- Large targets and small distances between targets are advantageous.
- Screen elements should occupy as much of the available screen space as possible.
- The largest Fitts-based pixel is the one under the cursor (why?)
- Screen elements should take advantage of the screen edge whenever possible.
  - The edges of the screen have infinite depth and no targeting required.
- Steering tasks – moving linearly in a “tunnel” of length $D$ and size $S$ is more difficult than pointing.

![Diagram showing implications of Fitts' Law]
Limitations of Fitts’ Law

- **Grouped targets** that are too close lead to overshoot errors
- Increased screen real estate
- Differing sizes conflict with consistency
- **Frequency-based** widget arrangements may be less efficient to find things than **logic-based** arrangements
- **Pop-up menus** not visible until activated
- **Speed-accuracy tradeoff** - fast decision – more errors and visa versa