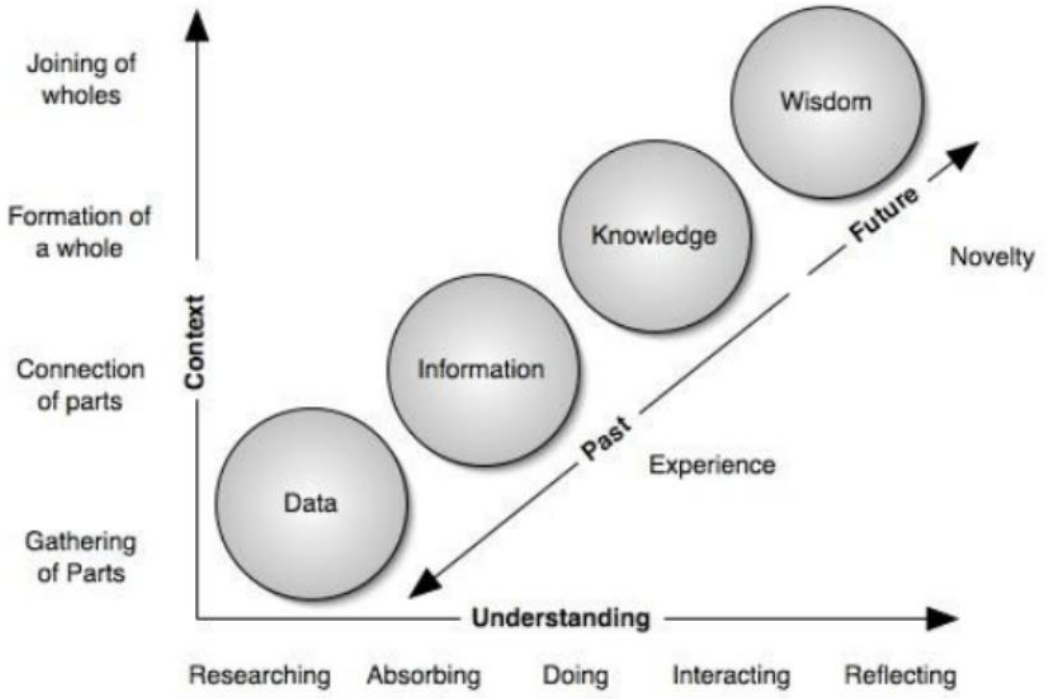
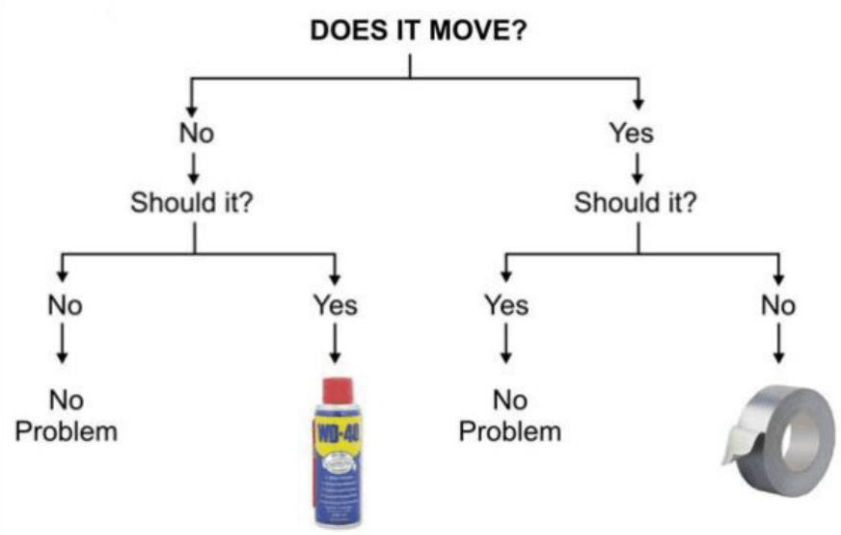
ENSE 271 – Knowledge in the Head & in the World

- About Knowledge:
  - Knowledge: Incomplete, ambiguous, just wrong
  - Must combine what is in the head with what is in the world

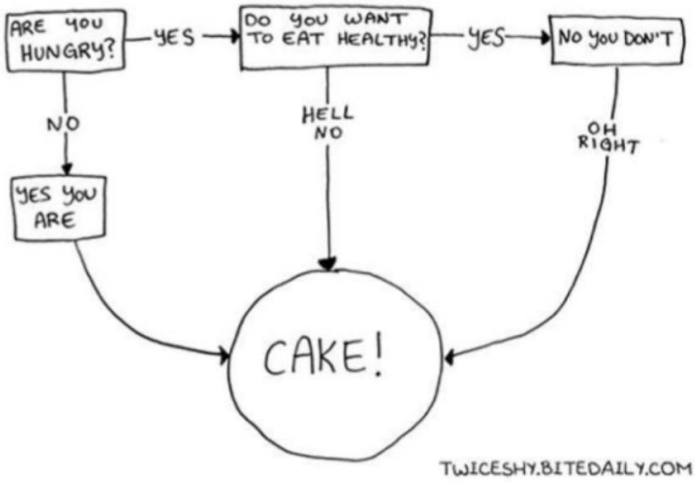


- Rational thought/choice

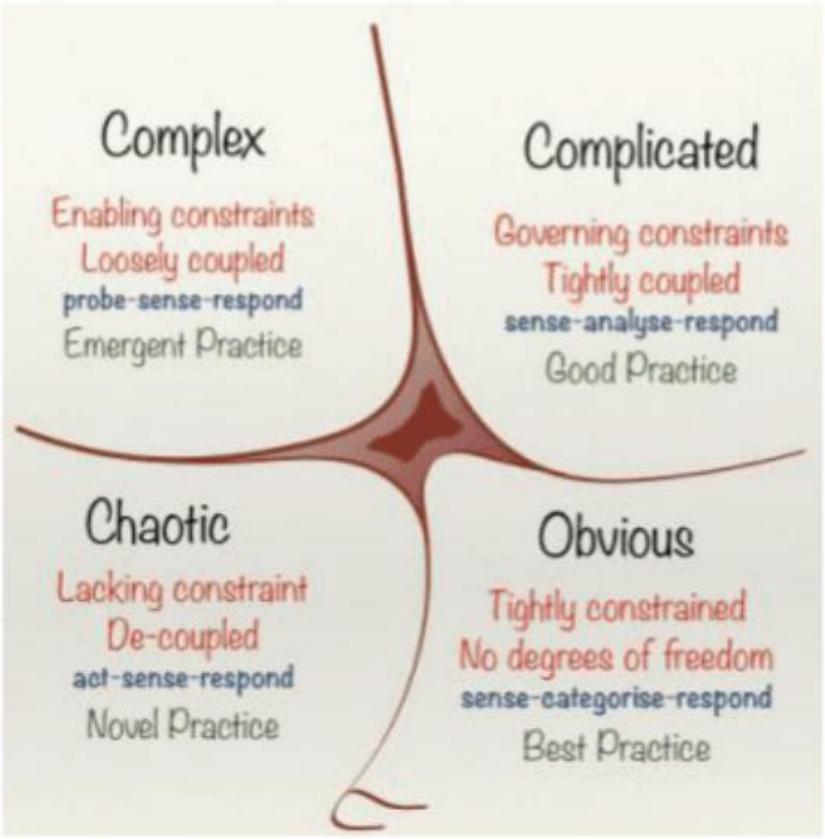


  - Compensatory decision making – Highly mathematical rational strategy that involves weighing the pros and cons of different options

- Bounded Rationality – the idea that people make rational decisions within limits, such as those imposed by time constraints, cognitive limitations, and lack of information (RATIONAL DECISIONS MADE ON INCOMPLETE SYSTEMS) This is non-compensatory decision-making.



- Types of knowledge & Memory:
  - Declarative Memory: the ability to consciously recall facts and events



- Procedural Memory: the memory of how to do things, such as riding a bike or driving a car.

- Design for knowledge in the world:

    - Affordances: the idea that objects and environments have qualities that suggest how they can be used.
    - Signifiers: visual and audio cues that help users understand how to interact with a product or interface.
    - Physical Constraints: Limitations imposed by the physical world
    - Natural Mapping: a design principle that matches the controls of a system to the desired outcome (Door push/pull)
    - Use of metaphors: to make products more meaningful and appealing ("A thing regarded as a representative or symbolic of something else"—Trash Icon)
    - Sometimes External Factors: Politics, changing input devices

- Memory:

    - Short Term:
        - Working memory, brief
        - Design Implication: Knowing short term memory, how can we make this easier

    - Long Term Memory
        - Memory of the past
        - Arbitrary things
            - Rote Learning: memorization technique based on repetition
        - Meaningful things: Door plate for push, handle for pull
        - Design Implications: Red light = stop, people don't mind learning once, but if more and more... your technology is failing

- Trade-offs, Knowledge in head and the world

TABLE 3.1. Tradeoffs Between Knowledge in the World and in the Head

Knowledge in the World	Knowledge in the Head
Information is readily and easily available whenever perceivable.	Material in working memory is readily available. Otherwise considerable search and effort may be required.
Interpretation substitutes for learning. How easy it is to interpret knowledge in the world depends upon the skill of the designer.	Requires learning, which can be considerable. Learning is made easier if there is meaning or structure to the material or if there is a good conceptual model.
Slowed by the need to find and interpret the knowledge.	Can be efficient, especially if so well-learned that it is automated.
Ease of use at first encounter is high.	Ease of use at first encounter is low.
Can be ugly and inelegant, especially if there is a need to maintain a lot of knowledge. This can lead to clutter. Here is where the skills of the graphics and industrial designer play major roles.	Nothing needs to be visible, which gives more freedom to the designer. This leads to cleaner, more pleasing appearance—at the cost of ease of use at first encounter, learning, and remembering.

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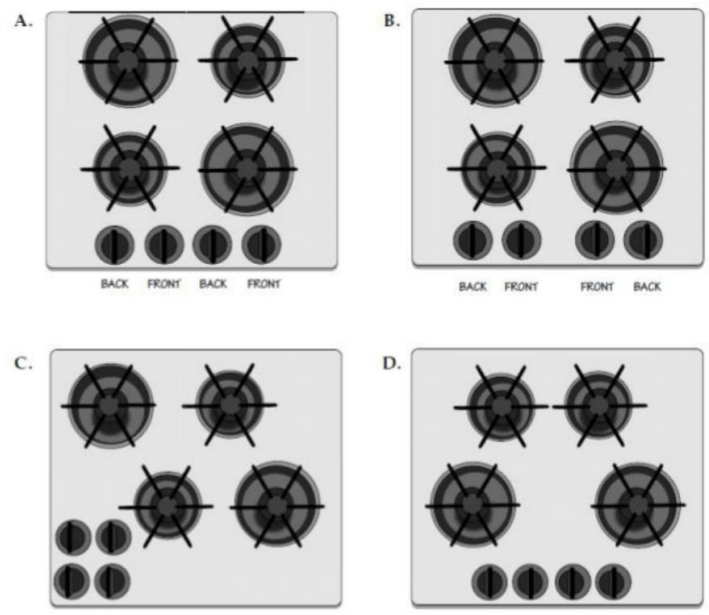
- Interface design Mapping:
  - Natural Mappings
    - Best mappings
    - Second best mappings
    - Third best mappings



  - Culture and Design:
    - Traditional Chinese read right to left
    - North America read left to right

- Interface Design Metaphors & Skeomorphs:
  - Metaphor:
    - ("A thing regarded as a representative or symbolic of something else"—Trash Icon)
  - Do's:
    - Make the unfamiliar familiar
    - Awake positive associations
  - Don't
    - Simplistically literal metaphor
    - Blindly mimic the real world
  - Skeomorph: Object or feature that imitates another object or material
    - Might help if your customer is a niche-professional (North Star Customer)