

# Knowledge in the Head and in the World

Lecture 05 of *Researching People-Centred Design* with Tim Maciag



University  
of Regina

Faculty of  
Engineering and  
Applied Science



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# Outline

- Knowledge
- Memory
- Design tips and tricks to help our knowledge/memory

# About knowledge

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- The power of knowledge, a story



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- The power of knowledge, a story
- Knowledge
  - Incomplete
  - Ambiguous
  - Just wrong



# About knowledge

- The power of knowledge, a story
- Knowledge
  - Incomplete
  - Ambiguous
  - Just wrong
- Must combine what's in the head with what's in the world

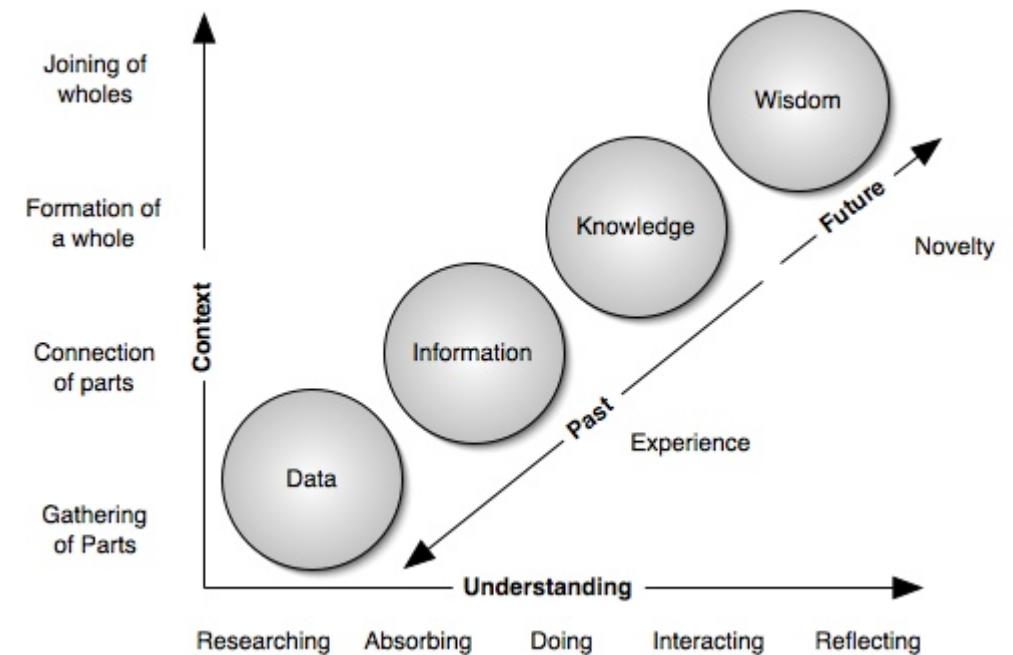


# Precise behavior from imprecise knowledge

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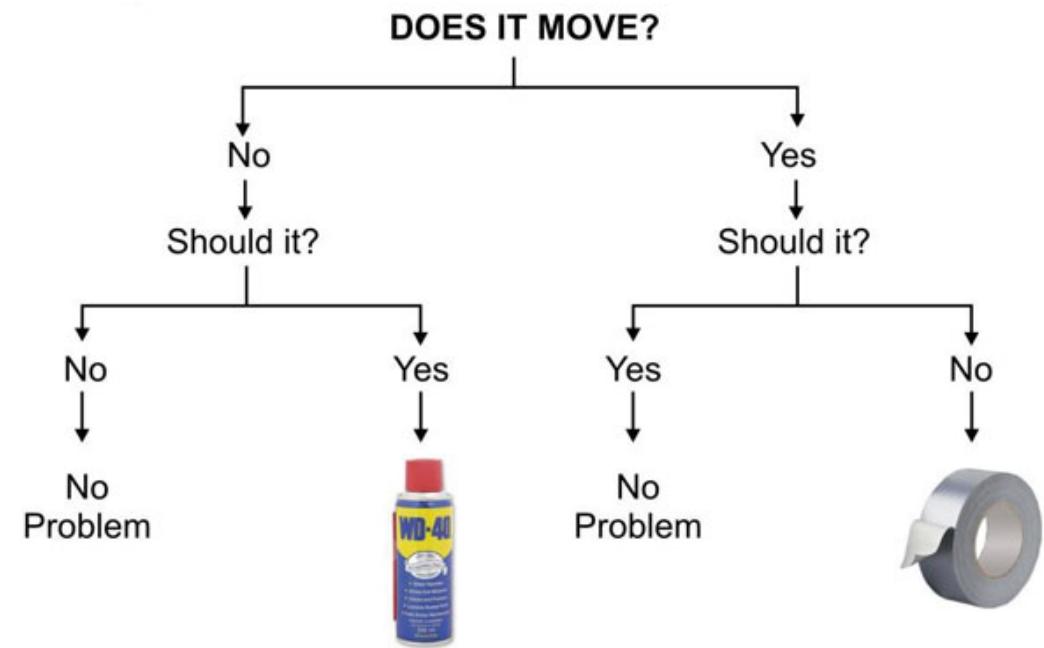
- Knowledge is both in the head and in the world
  - Data to information to knowledge



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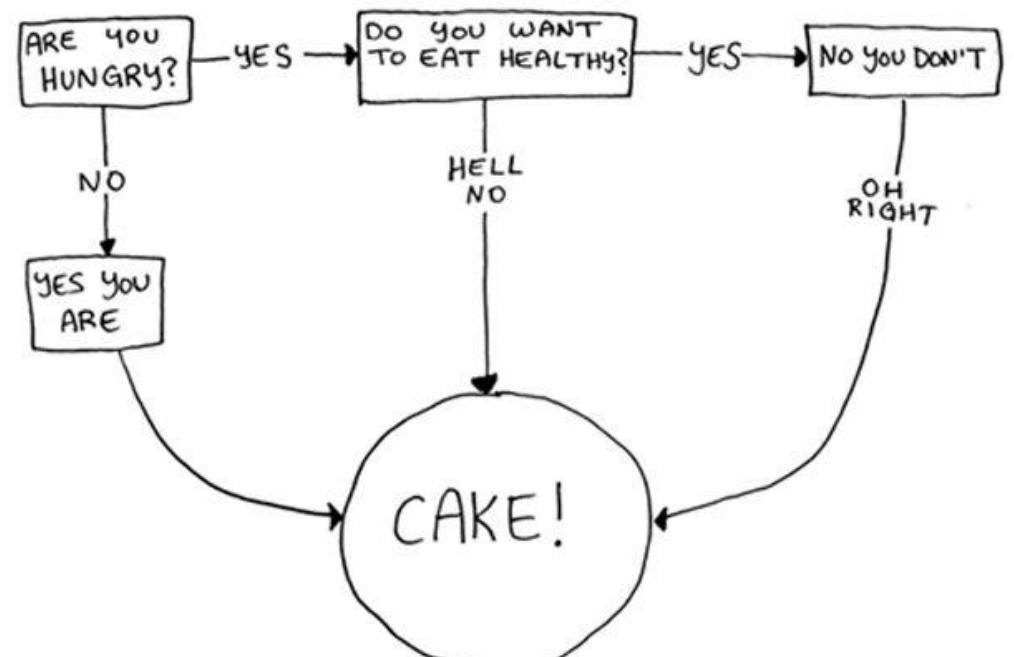
- Knowledge is both in the head and in the world
  - Data to information to knowledge
- Great precision is not required
  - Rational thought/choice ([Herbert Simon](#))
    - Compensatory decision-making
  - Bounded rationality
    - Non-compensatory decision-making
  - NOTE: [Implications for AI](#) | [AI & Autism](#)



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  - Natural and physical, e.g. keyboard and mouse interaction as seen first in Douglas Engelbart's [Mother of all demos](#) (1968)



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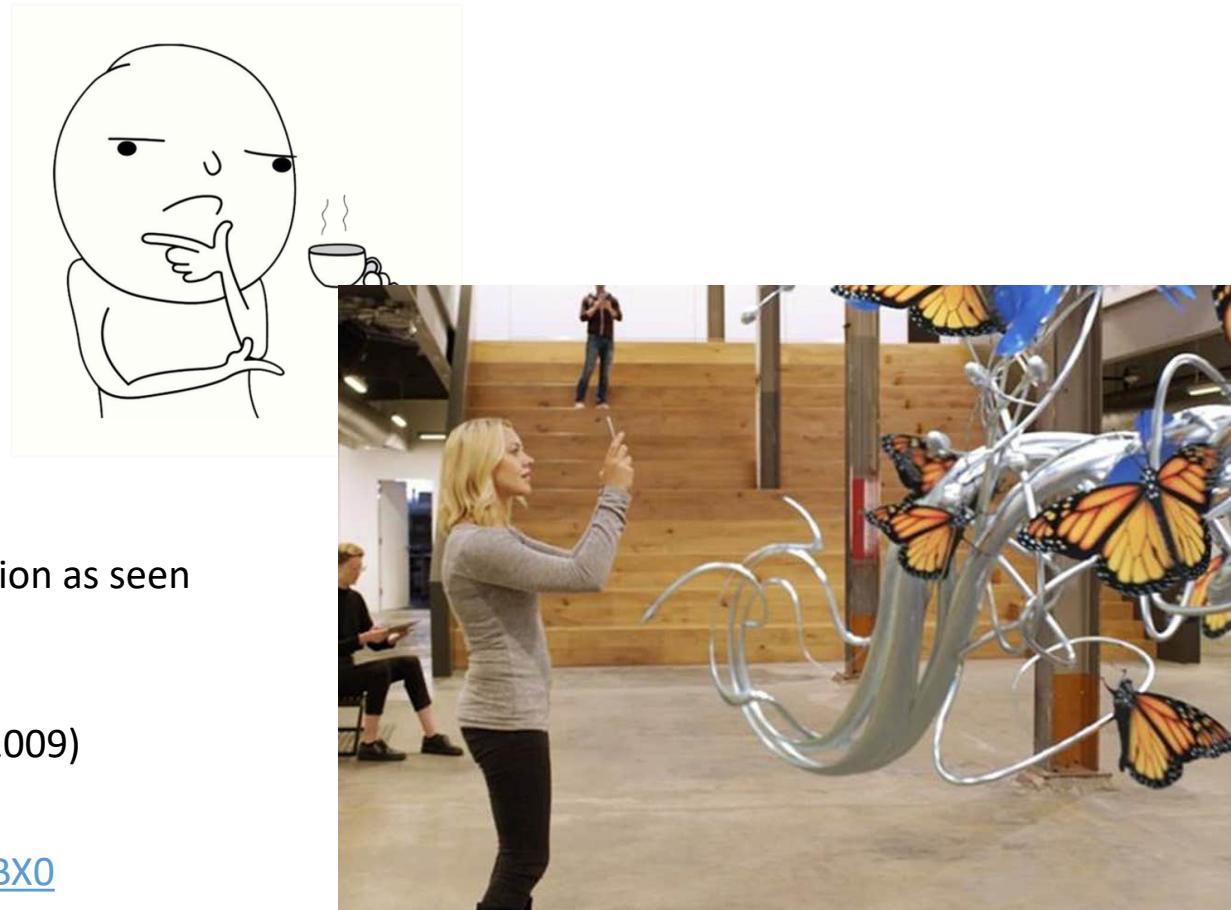


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- Is this for real?
  - The now (AR): Adobe Areo: <https://youtu.be/lutVq6cPBX0>

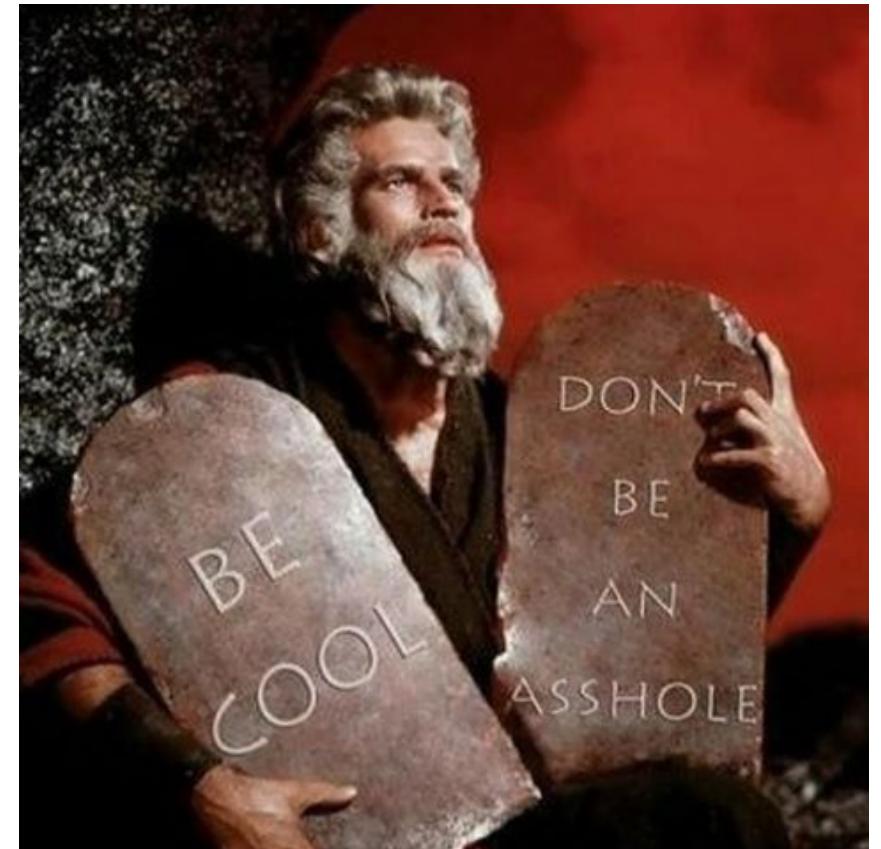
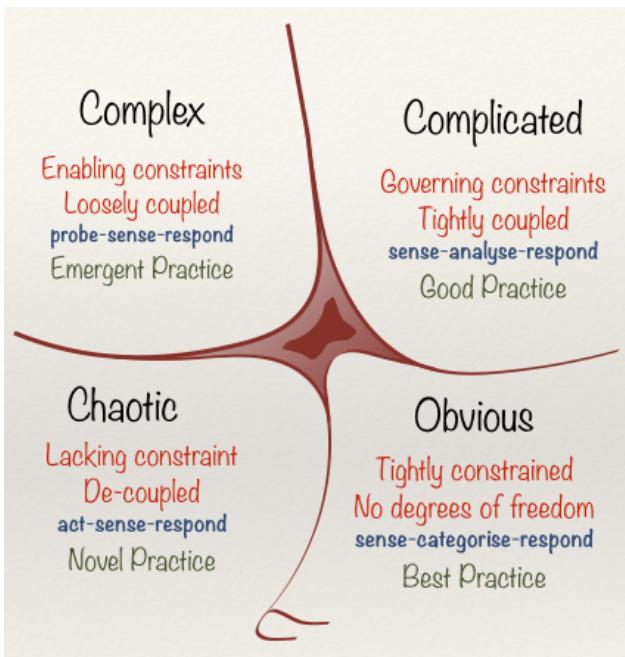
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# Types of knowledge & memory

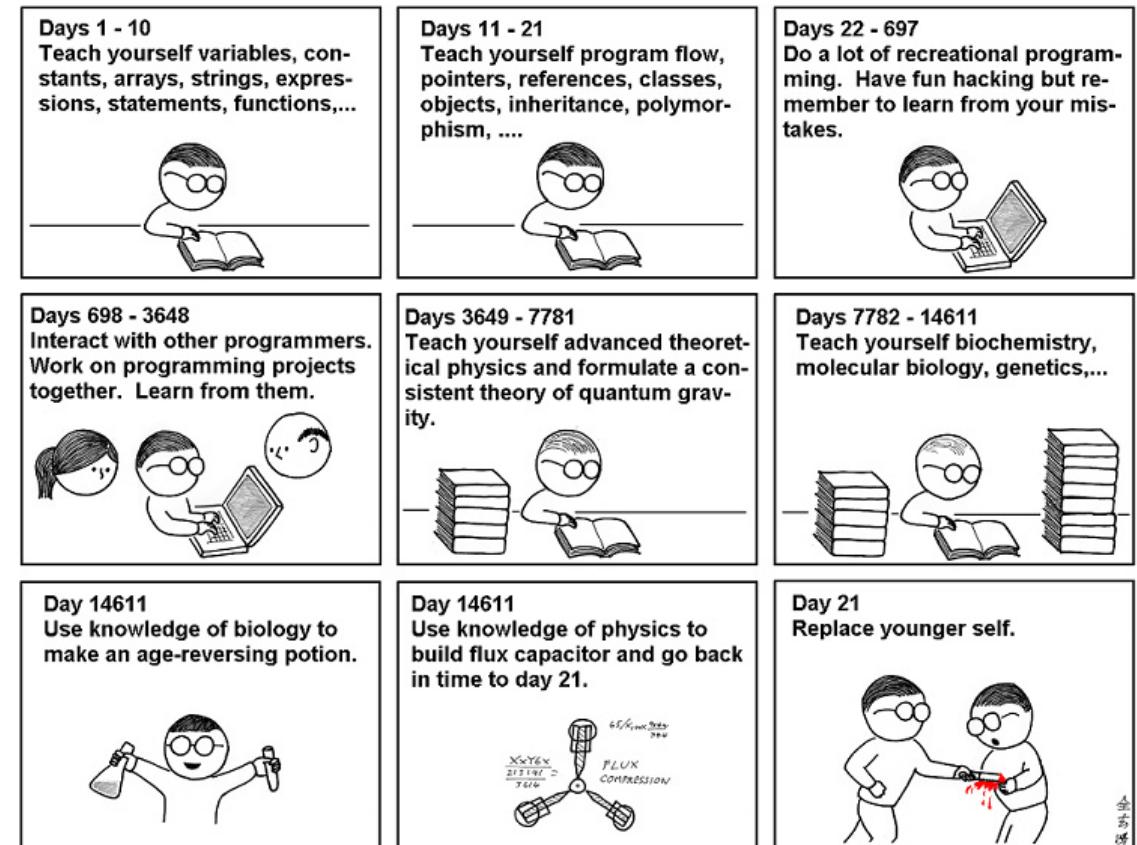
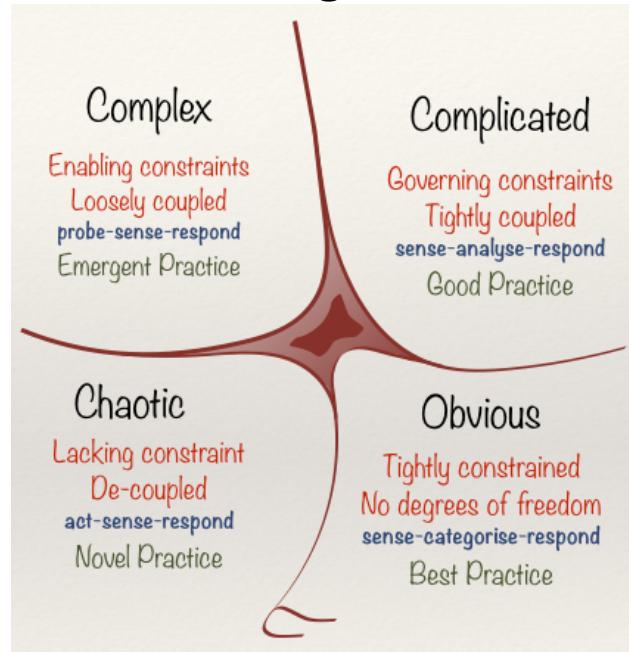
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- Declarative memory
  - Knowledge of



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- Procedural memory
  - Knowledge how



As far as I know, this is the easiest way to  
"Teach Yourself C++ in 21 Days".

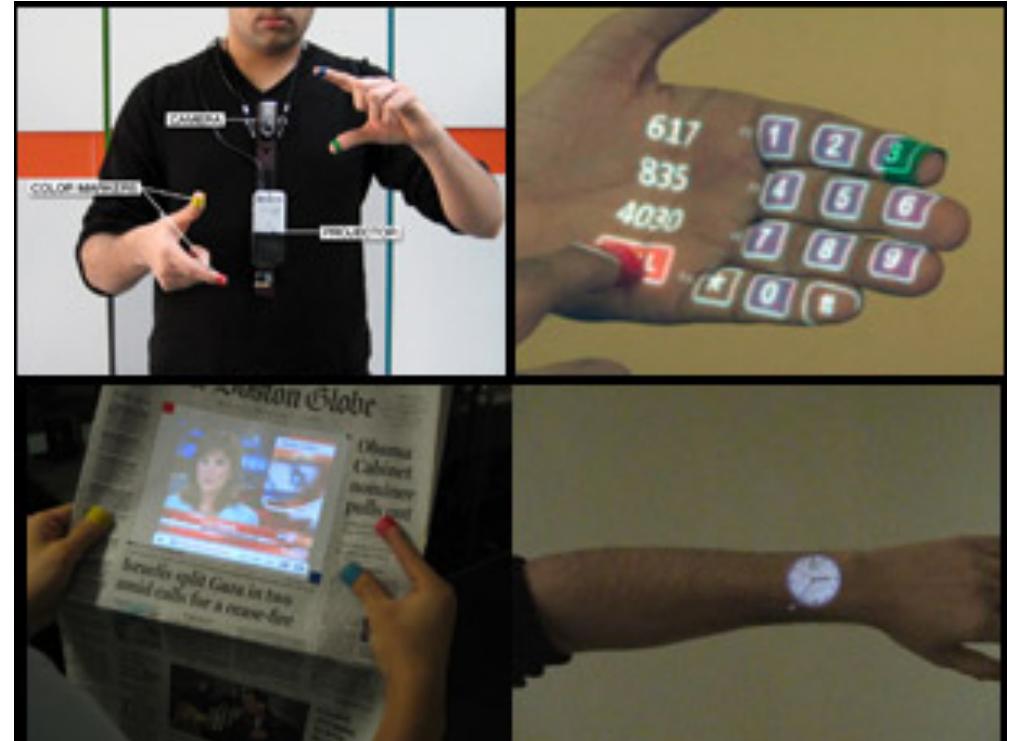
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  - Signifiers
  - Physical constraints
  - Natural mappings
  - Use of Metaphors (more on this later)



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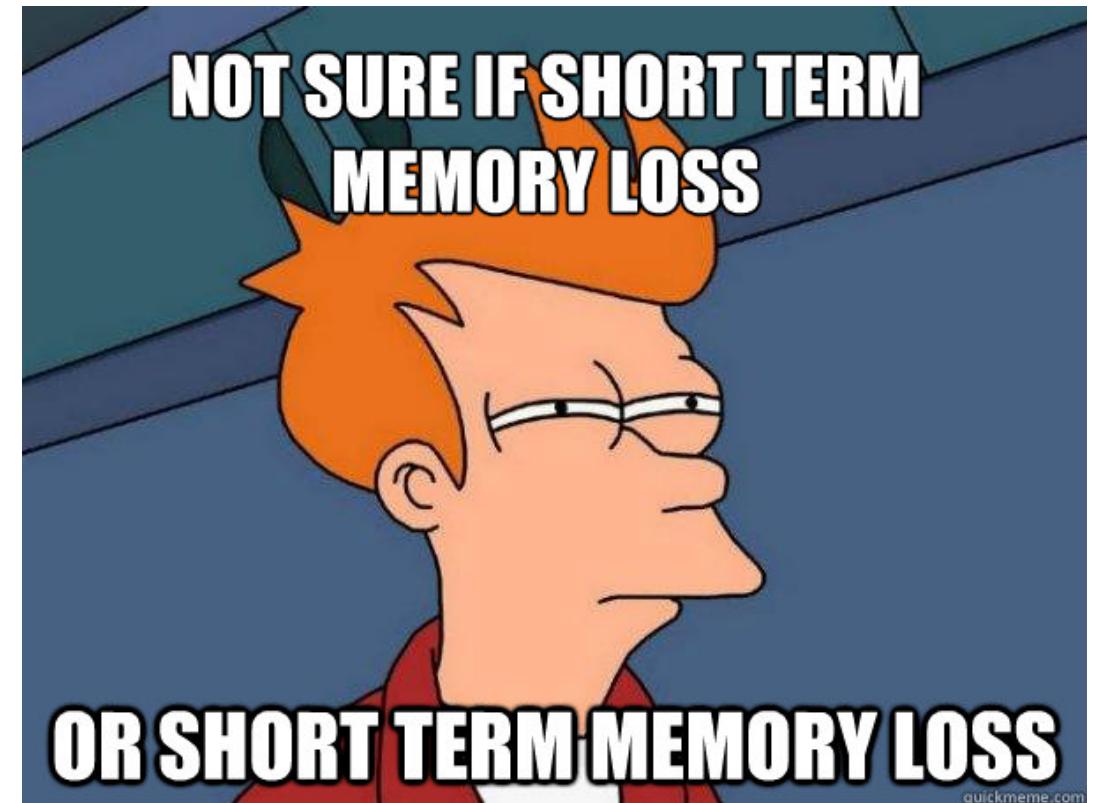
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  - Use of Metaphors (more on this later)
- Sometimes external factors can impact design
  - Politics (e.g. changing the colour of money)
  - Changing input devices!



# Memory

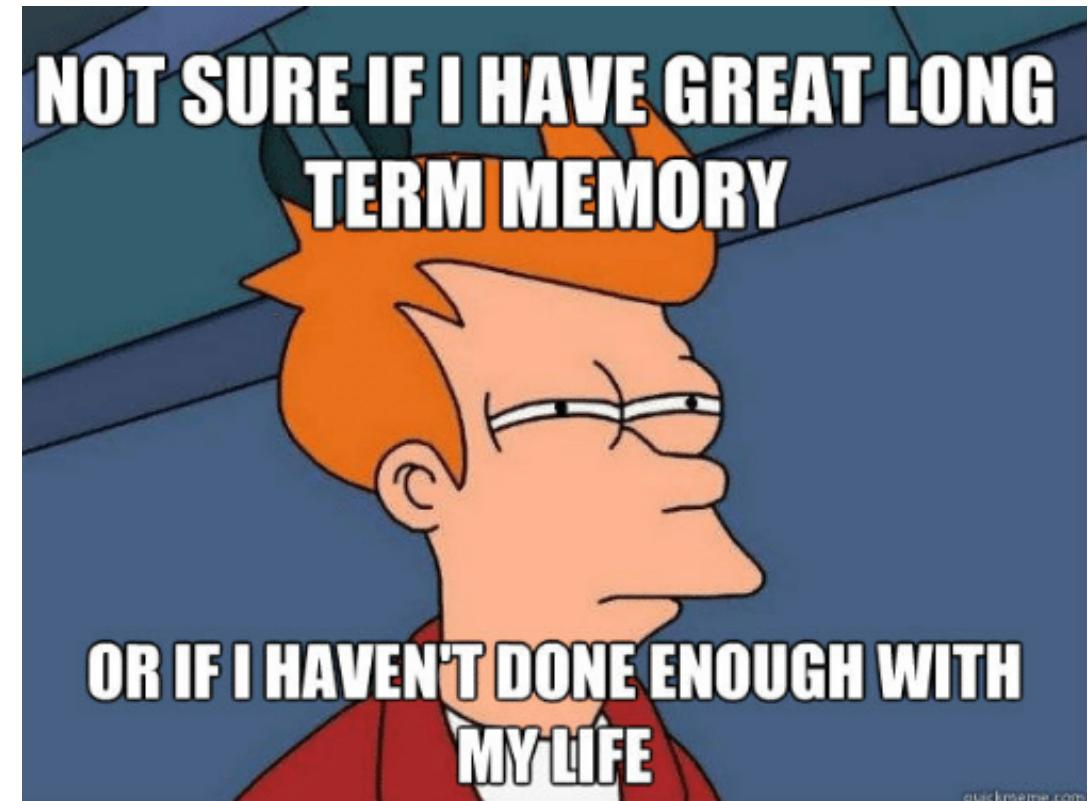
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  - Design implications



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- Short-term (STM)
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- Long-term (LTM)
  - Memory for the past
  - Arbitrary things
    - Rote learning
  - Meaningful things
  - Design implications



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Ease of use at first encounter is high.	Ease of use at first encounter is low.

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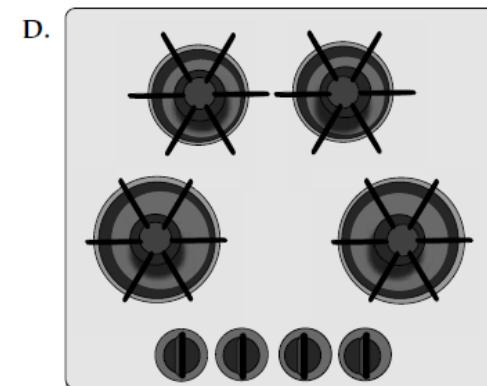
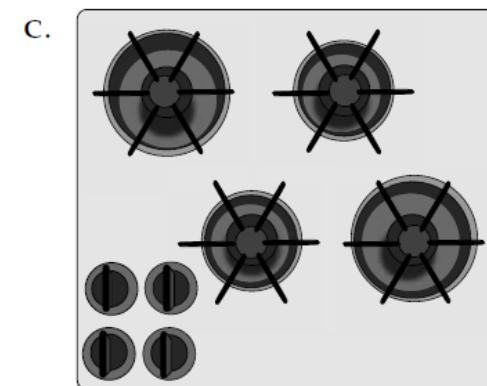
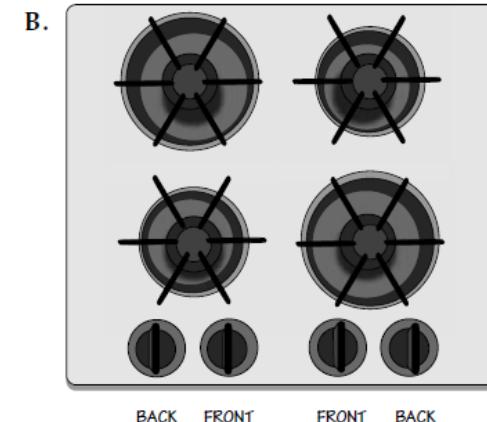
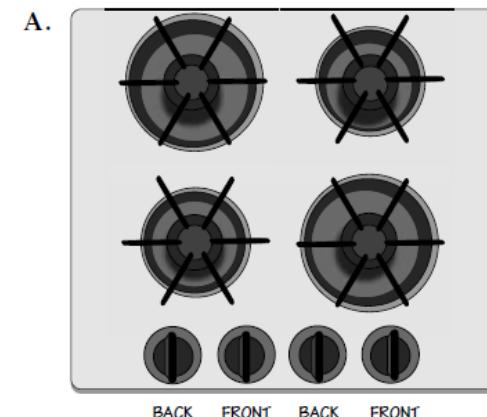
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Slowed by the need to find and interpret the knowledge.	Can be efficient, especially if so well-learned that it is automated.
Ease of use at first encounter is high.	Ease of use at first encounter is low.
Can be ugly and inelegant, especially if there 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.

# Interface design mappings

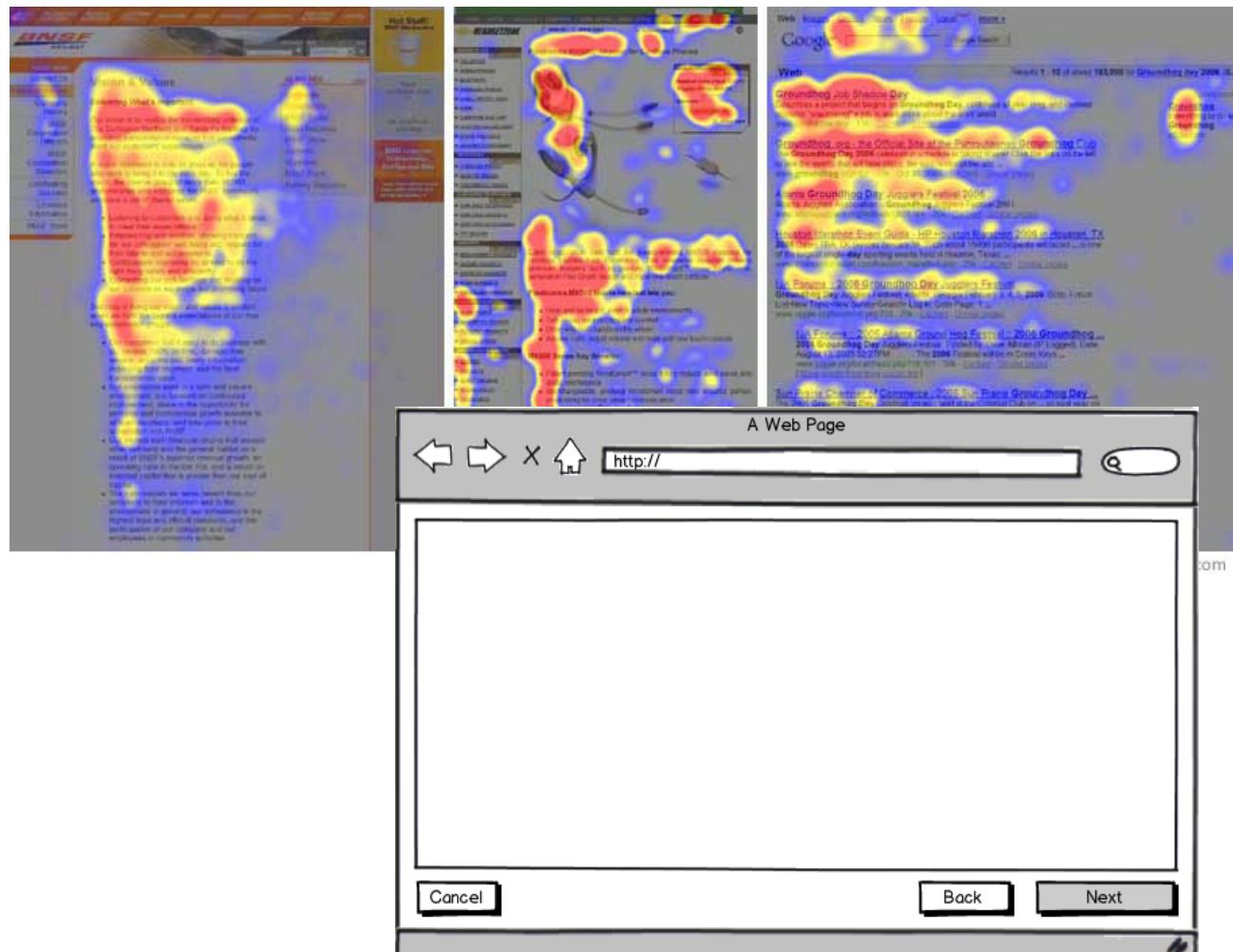
# Interface design mappings

- Natural mappings
  - Best mappings
  - Second-best mappings
  - Third-best mappings



# Interface design mappings

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  - Best mappings
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  - Third-best mappings
- Culture and design
  - Traditional Chinese read right to left
    - *Big Stuff the Same, Details Differ*
  - In North America, left to right
    - We read interfaces the same
    - Top/left to bottom/right  
(for the most part)

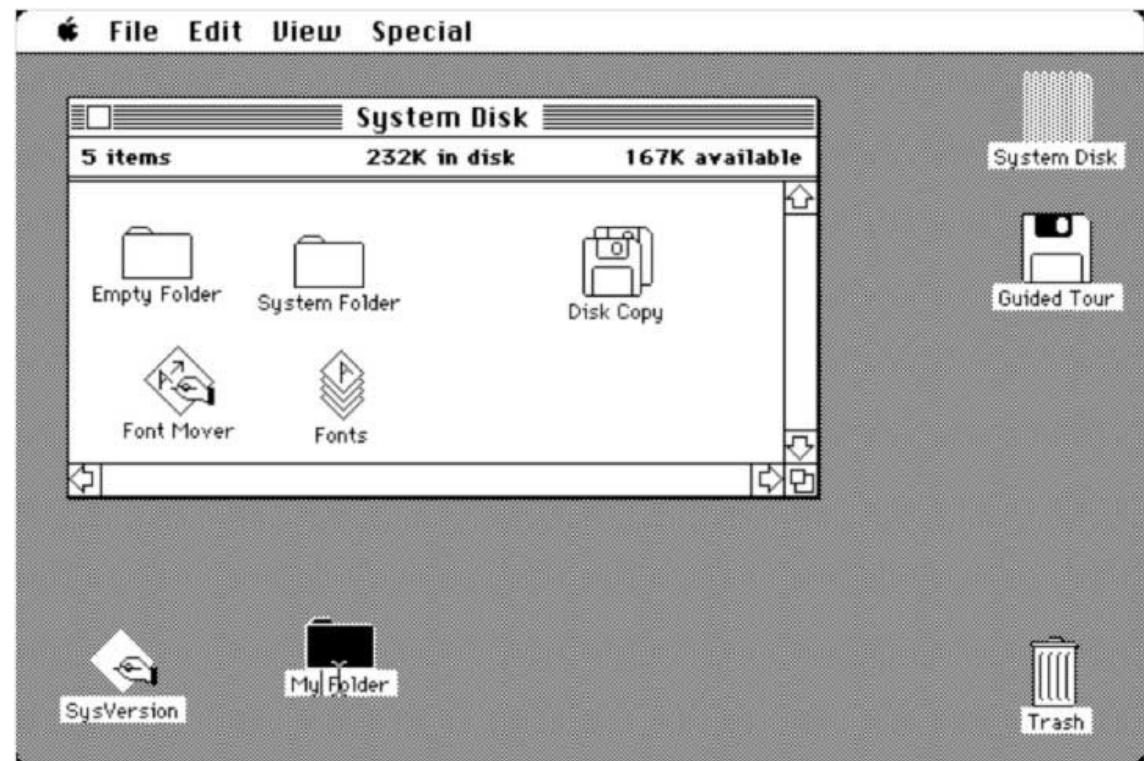


# Interface design metaphors & skeomorphs

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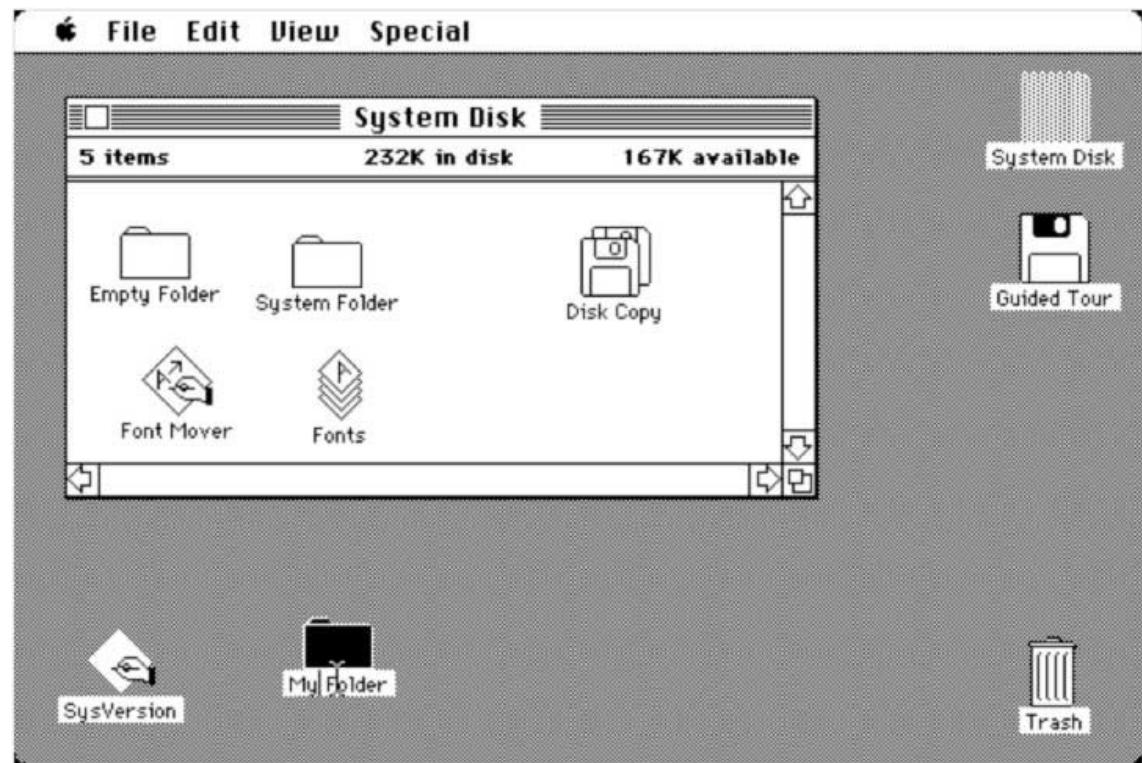
- Metaphor
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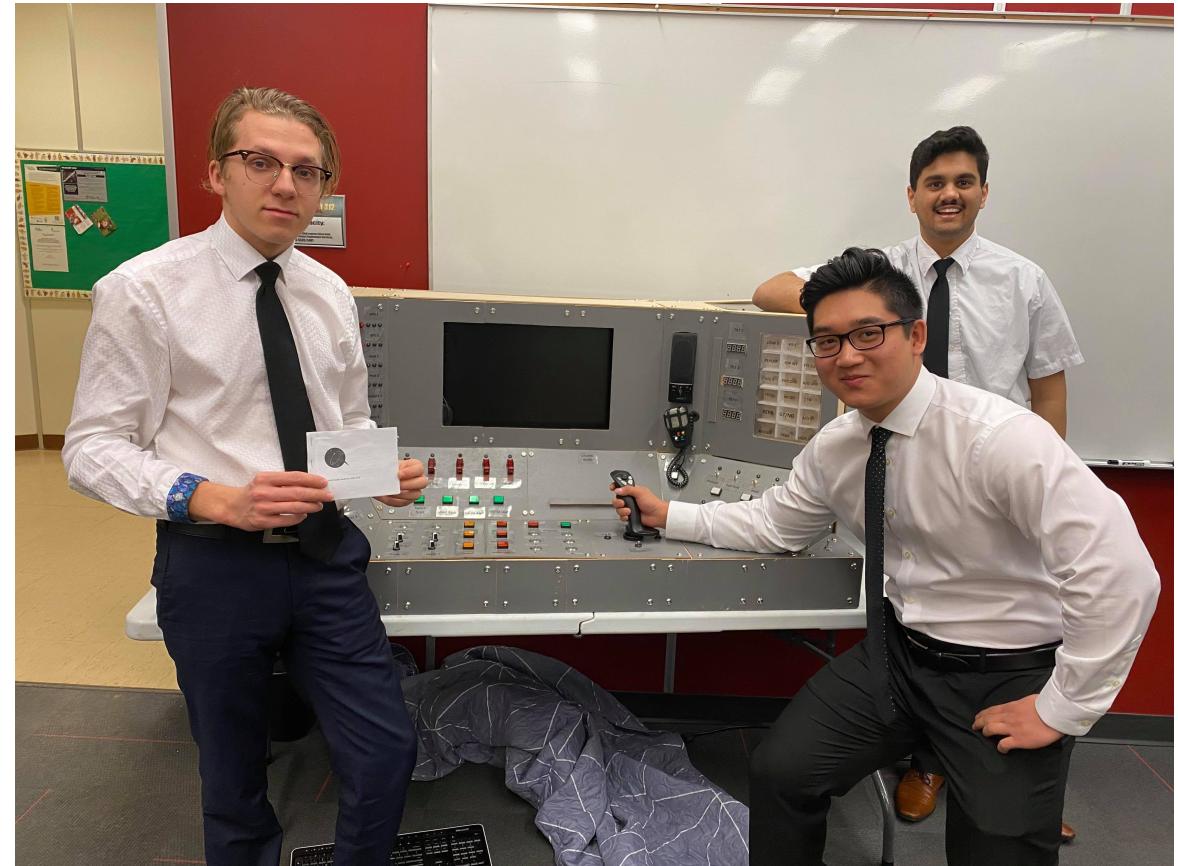


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# Interface design metaphors & skeomorphs

- Metaphors
  - Representing abstract concepts as concrete objects
- Do's
  - Using metaphors to facilitate learning
  - Aligning metaphors with user goals
  - Ensuring consistency between metaphors and system behavior
- Don'ts
  - Overusing metaphors that don't align with user needs
  - Using metaphors that are unfamiliar or confusing to users
  - Failing to provide clear context or mappings for metaphors
- Skeomorphs
  - Representing physical objects or actions in digital interfaces



# Discussions/questions

- Non/compensatory knowledge
- Declarative knowledge
- Mouse/Keyboard
- STM/LTM
- Icon/dropdown arrow placement
- Metaphors

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