People Use Systems
To Get Work Done

- Main Ideas:
  - Most devices are harder to use than they need to be.
  - People often blame themselves.
  - People have knowledge, learned skills, expectations.
  - People have fundamental capabilities and limitations.
  - Good design takes these human characteristics into consideration.
  - Norman (1990) provides a perspective and a set of concepts for designing and evaluating devices based on these human characteristics.

Knowledge in the Head and in the World

- Precise Behavior from Imprecise Knowledge
  - The world (devices and/or the environment around you) reminds you how to do things, and thus helps to direct the interaction.
  - Examples:
    - Giving precise directions from memory versus just going there.
    - Describing coins in detail versus recognizing them.
    - Experienced computer users can only recall the names of some frequently used menu items when they are in the middle of a task and they are about to need that item. Mayes, et al. (1988)
  - What options appear after entering your PAC on DuckCall?
    - Or: How do you list your full class schedule? LF or 53.

Example: Put together a list of books on Janus
- I want a list of books on "group dynamics" so I could go to the library and browse through them.
- I was prepared to just cut and paste from the UO Library on-line catalog
- The device dictated some of the details of the task.

Seven Stages of Human Action
- A model of how people interact with the world.
- Why does failure occur in this cycle?
  - Gulf of execution:
    - Difference between intentions and allowable actions.
  - Gulf of evaluation:
    - Amount of effort needed to interpret how well intentions and expectations have been met.

Examples of Gulfs of Execution:
- You are done putting a file onto a floppy disk and want to get the disk out of the machine.
- How do you lighten and crop photos using JPEGView 3.3?
- How do you.....
  - Beware! The solution is not to put in everything! Beware of Creeping Featurism!
  - How do you print a letter you just typed?

People have fundamental capabilities and limitations
- Memory
- Learning
  - An ability to interpret knowledge in the world (sometimes called "distributed cognition"), to make sense of the world, and to figure things out.
  - In general, designers rely too heavily on these.

Memory (or Knowledge)
- Procedural vs. declarative (or conceptual)
  - Procedural knowledge is only sometimes subconscious.
    - Subconscious: riding a bike.
Conscious: making muffins.
- Declarative: facts about the world.

- Long term memory versus short term memory.
  - Difference in capacity, decay time, and the type of encoding.
  - Example: Student names.

+ Natural mappings:
  Memory in the world.
  - How do you know when you have figured out the natural mappings?
  - How did Norman figure out the "Full Natural Mappings" on p. 77?

+ "Natural mappings"*
  - What's the point? To some extent, "natural mappings" do not exist.
  - Norman's Fig. 3.5 (top) burner-to-control mapping was called "natural" because it provided the greatest spatial compatibility, but this was determined through empirical testing by human factors researchers, not by intuition. Real people doing real tasks, i.e. "Turn on that burner."
  - In another experiment, (Shinar and Acton, 1978) participants were asked which controls they thought controlled which burners, and participants most frequently chose Norman's Fig. 3.3.
  - You can't just think about it and get it right. You can't just ask people what they think and get it right.

+ Constraints
  - Physical: You can't put a square peg into a round hole.
  - Semantic: Knowledge of a situation and the world limits possible interpretations of meaning.
  - Cultural: Social norms limit possibilities.
  - Logical: Some things just makes sense. But be careful. It's not always obvious what is "logical," "intuitive," "natural." How do you figure it out?
  - Are these all distinct constraints?
  - Are there others?

- Labels are okay.

- Using the Seven Stages to Ask Design Questions

+ Design concepts:
  - Visibility
  - A good conceptual model
  - Good mappings
  - Feedback