IC 463, Intro to Human Computer Interaction Design: 7 (theory). Learning

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Learning is active

- Manuals for computer software are really bad...
- Would it matter if they were better?
- Most people learn by
  - Watching others
  - Trying it (data driven, hypothesis driven)
  - Guided performance
  - Transfer and analogy

Classic Theories of Learning

- You don't really need to know...
  - Naive theories (tales/religion)
  - Innate Knowledge (Plato)
  - Associationism
  - Kant's Synthesis
- Associative / Behavioral
  - Classical conditioning
  - Operant conditioning
  - Partial reinforcement and extinction
  - Errorless learning (?)
  - Spaced practice

Cognitive Theories

- Tolman's rats had mental maps!
- Induction from examples
  - The role of negative examples
- Explanation-based learning
- Case-based and learning by analogy
- A Cognitive Theory
  - Declarative knowledge
  - Procedural knowledge through association and chunking
  - Autonomous stage

A Few More Learning Concepts

- Transfer
  - Near and Far Transfer
  - Thorndike's Identical Elements
  - Negative Transfer
- Depth of Processing and Integration

Social Theories

- Socio-Cognitive Conflict Theory
- Vygotsky: Zone of Proximal Development
- Legitimate Peripheral Participation
- Collaborative learning
  - Act of articulation and justification (explanation, depth of processing)
  - Encountering alternatives (SCC)
  - Negotiation (LPP)
Errors

• We learn through errors (at some levels)
• Yet errors can divert us from learning
• Mistakes: based on misconceptions or faulty information; should be corrected by feedback
• Slips: unintentional mal-execution of an action

Errors

• Reduce conditions leading to errors
  - Minimalist approach
  - Selection rather than generation
  - Signaling context (but see next item)
  - Eliminating inconsistencies and modes
  - Checking potentially erroneous actions
• Yet design for errors anyway
  - We make errors and learn through them
  - Immediate Feedback
  - Undo

Novices and Experts

• Chase & Simon (1973):
• Experts chunk, so remember more
• Design for transition from novice to expert
  - Give novices explicit, declarative methods of acting
  - Give experts efficient means of acting
  - Common example: icons & menus versus key chords