

Education 173  
Cognition and Learning in  
Educational Settings

Critical Thinking and Reasoning  
Fall Quarter, 2007



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### Critical Thinking

- Another Major Category of Cognition
- What is Critical Thinking?
  - The evaluation of ideas for their quality, especially in judging whether they make sense
- A Critical Thinker Might Ask.
  - Is the reasoning clear?
  - Does one idea follow from another?
  - Are the ideas backed by evidence?

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### Concept Learning

- Concrete and Abstract Concepts
- Learning Concepts By Their Features
  - Defining features (rule formation)
    - A bird has [feathers]. . . A bird does [lay eggs]. . .
  - Typical features (prototype)
    - A [typically] bird flies, sings, perches in trees
- Learning Concepts By Examples and Nonexamples
  - Borderline cases can hep (Pluto, dolphins)
  - Superordinate and subordinate concepts
  - Basic concepts (mammal, DOG, spaniel)



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## Inferential Reasoning

- Inference is Going from the Known to the Unknown
- The Main Types of Inferential Reasoning
  - Inductive reasoning
    - From specific instance to general principle
    - Scientific discoveries often involve induction
  - Deductive reasoning
    - From general principle to specific instance
    - Scientific applications often involve deduction

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## Transfer

- Transfer is the Application of Knowledge Learned in One Setting to a Different Setting
  - Buying paint
- Types of Transfer
  - Positive and negative transfer
  - Near and far transfer



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## Learning Strategies

- Simple Rehearsal is One Way to Learn
  - Repetition, total time matters
- Enhancing Learning from Text
  - Distinguish the most important ideas:
    - Underline/highlight
  - Find structure: Draw a diagram; Outline
  - Elaborate: Write comments
- Mnemonics
  - Keyword mnemonic (Involves imagery)
    - (Haydn/Classical: "hiding" in a "class")
  - Acronyms (ROY G BIV) (EGBDF)

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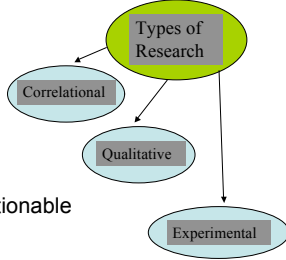
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## More Learning Strategies

- Concept Mapping
  - Nodes and links
- Self Talk
  - What is interesting and important?
  - What seems questionable or incorrect?
  - Do I understand?



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## Time Management

- Massed vs. Distributed Practice
  - A “law” of learning
  - For a set amount of study time, how is it best arranged?
    - Spread it out rather than bunch it together
- Goal Setting
  - Proximal goals
    - Rather than distal
  - Specific goals
    - Rather than general



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