Slide 1

Slide 2

- Susan Meyer Markle
    - Front-end analysis
    - Differences inherent in learning concepts, verbal skills, and motor skills
    - Influences on early CBT

Slide 3

- Traditional educators
    - Naïve ID
    - Looking for magic
    - Don’t understand details
- Process that creates DI programs, effective teaching machines, fluency aims, etc

Slide 4

- Decision
  - "We're done, completed, it will work."
  - or tryout in class?
- If tryout
  - Teachers report
  - or observe firsthand?
- Criteria
  - Some, most, or all?
- If have prereq, then program should work
- Learn *everything* teachers teaches

Slide 5

- Put our ego on the line.
- Probably lots of failure
- Decision
  - Bad kids / teachers (but program good)
  - or take responsibility

Slide 6

- Redo program
- How to interpret errors?

Slides 7-10

- New learners from intended audience
- Better, but not flawless
- Revise again
- More learners and more errors
- Work out lumps

Slides 11-13

- Confidence in program
- Of course, can only be confident if implemented in the recommended (and tested) manner

Slides 14-15

- Not “consistent with the way kids learn”
- Stifle creativity
- Too structured
- No understanding of the subject

Slides 16-17

- Typical development sequence
- You may not be that arrogant after your first draft
- But the commercial publisher is
- Not responding to what learners like; expressing what they like

Slide 18

- Mastery of concepts very important
- Disagreement on what concept learning is

Slide 19

- To better teach, must “tune up” the learner’s cognition
- Instruction is the proving ground of theories. Cognitive theories too broad to suggest specific detail.
- Schema theory doesn’t provide any specific directions
- Sounds like a lot of details and pieces of the puzzle, but still no clear picture on what to do or what concept learning should look like.

Slides 20-21

- Environmental perspective on concepts and conceptual learning

Slide 22

- Stimulus classes
- Generalization: give same response to new example
- Discrimination: react differently to examples and nonexamples

Slide 23

- Mentioning name of concept: not conceptual lesson (apple)
- Giving definition: not conceptual lesson (the usually round red or yellow edible fruit of a small tree)
- Giving an example: not conceptual lesson (see this apple)

Slide 24

- More than one example to illustrate concept
- Nonexamples that are almost examples
- Appropriate practice with novel examples and nonexamples

Slide 25

- Ability to spout memorized definition is not evidence of conceptual understanding (i.e. the response under the control of the full range of stimuli that should evoke the response)
- Dictionaries usually fail to pinpoint what controls response.

Slides 26-27

- Example of difficulty in pinpointing the controlling variables

Slide 28

- For simplicity, we'll talk as if concepts are taught one at a time
- But, not the way we really teach

Slides 29-30

- Systematic way of picking efficient examples and nonexamples

Slides 31-32

- Far out nonexamples

Slides 33-34

- Find a prototype, that is the very essence of your concept.
- Discover what is essential to the concept and what is not
- Find as many properties as you can and work them over to discover whether or not they are critical

Slides 35-40

- Critical attributes
    - If changed, becomes a nonexample

Slides 41-47

- Variable attributes
    - If changed, becomes a new example
- Not quite the same as irrelevant considering their importance in teaching

Slide 48

- Many variable properties, some of which are unimportant
- Use salience combined with empirical testing to decide which variable attributes to include in teaching plan

Slide 49

- Close-in nonexample
- Nonexample that lacks one and only one of the critical attributes

Slides 50-53

- Minimum Rational Set of Close-In Nonexamples
    - Smallest set of stimuli in which every missing critical attribute is represented across close-in nonexamples

Slides 54-58

- Minimum Rational Set of Examples
    - Smallest set of stimuli in which <u>all</u> relevant dimensions of variable attributes are represented across examples
- Attributes with fewer dimensions may be reused in any way you want to put the last cases together

Slide 59

- Note of the adequacy of Minimum Rational Sets for instruction

Slide 60

- How many dimensions is enough for full variation?

Slide 61

- More efficient that just select the examples and nonexamples that come to mind

Slides 62-63

- Lack of agreement is not unusual
- How to handle debatable attributes?

Slides 64-66

- Far-out examples
- Example that has a variable attribute of "present" whereas all other examples are classified as "absent" or "none" for that variable attribute

Slide 67

- Divergent examples
    - Two examples (have all critical attributes)
    - No variable attributes in common

Slide 68

- Matched nonexample
    - 1 example, 1 close-in nonexample
    - Variable attributes match completely
    - All critical attributes but one match

Slides 69-78

- When testing
    - Use novel stimuli
    - Generalization
    - Discrimination

Slides 79-83

- Errors
- Overgeneralization: Incorrectly accept nonexamples
- Undergeneralization: Incorrectly reject examples

Slide 84

- If overgeneralizing
- Add more close-in nonexamples to instruction

Slides 85-87

- If undergeneralizing
- Increase range of examples used during teaching
- Look for salient variable attributes you may have neglected

Slide 88

- May get impression to add as many examples and nonexamples as possible
- Not good idea (despite Principle of Small Steps):
    - Frustration at pace
    - Tedious for all but the slowest learner
- Lean programmers / very tough lessons / errors pinpoint assumption
- Principle 1: Do not include instruction on any prerequisite knowledge or skill that learner could possibly already know
- Principle 2: Include only the minimum amount of practice