Does Technology Improve S&H Training?

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Poll Questions

- Does technology improve training?
- Who prefers not to use PowerPoint?
- Who has heard, I know this is hard to see, but….?

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Objectives

- Describe important instructional issues in using technology
- Compare the benefits and problems in using selected technologies
- Select the appropriate technology based on training needs

Learning Comes First!

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Learning

- Change
  - Knowledge (cognitive)
  - Skills (psychomotor)
  - Attitude (affective)

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Instructional Systems Design

- Analysis (need)
- Design (learning objectives)
- Development (technology)
- Implementation
- Evaluation

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Adult Learning Theory

- Application driven
- Rich in experience and knowledge
- Diverse
- Intrinsically motivated
- Self-directed

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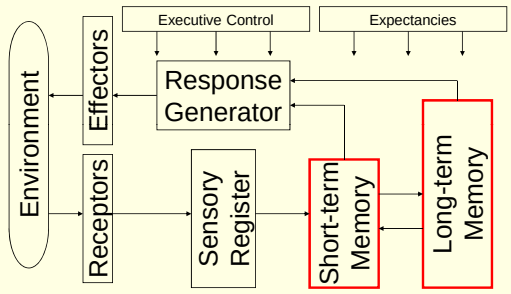
Cognitive Learning Theory

- Learning is an active process
  - Selecting
  - Organizing
  - Integrating
- Learning is limited by short term memory

Information Processing Theory



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Events of Instruction

- Gain attention
- Provide objectives
- Link to experience
- Deliver instruction
- Provide examples
- Practice
- Feedback
- Apply

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Cognitive Load Theory

- Short Term Memory is Limited
- Types
  - Intrinsic Load
  - Germane (Relevant) Load
  - Extraneous (Irrelevant) Load
- Goals
  - Reduce irrelevant load
  - Increase relevant load
  - Manage intrinsic load

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Multimedia Learning Theory

- Words (text or narration) and pictures are processed separately in separate channels
- Learning is improved when you use both words and pictures

Technology Supports Learning

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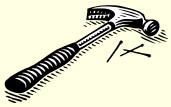
Technology

- Applied science
- Typically hardware and/or software
- Tool to deliver or support learning



Technology History

- Radio (~1900)
- Television (~1930)
- Internet (~1970)
- IBM PC (1981)
- PowerPoint (1984)
- Laptop PC (~1985)
- WWW (~1990)
- Broadband and WiFi (~2000)

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Technology Benefits

- Productivity
- Efficiency
- Convenience and flexibility
- Time and cost savings?
- Improve learning outcomes?

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Technology and Learning

- Use of technology shows no significant difference in learning
- Some studies show slight improvement with technology (attributed to ISD, not technology)

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Technology Selection

- Need/Situation
- Instructional design (ADDIE)
- Learning theories
- Budget
- Personal preference

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Instructional Situations

- Face-to-face
- Distance Learning (separation by time and space)
  - Instructor Led - Synchronous
  - Instructor Led – Asynchronous
  - Self-instructional

Face-to-face

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Avoid Death by Video

- Passive
- Violates some learning principles
- Short, case-based work best
- Good for demonstrating complex or motion situations
- Needs intro in and follow up

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Death by PowerPoint

- Expression started in 2001
- 40 words and 8 seconds of reading
- Elevates format over content
- Caused the space shuttle Columbia disaster
- Mind-numbingly dull, trivializes content, should be ditched

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Avoid Death by PowerPoint

- Slide Master Colors
  - Dark background with light text
  - Off-white background with dark text
  - No more than three colors on a slide
  - Avoid green or red contrasting colors
  - Avoid complex backgrounds

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Avoid Death by PowerPoint

- Slide Master Fonts
  - Sans Serif Fonts (e.g., Arial)
  - Use sentence case
  - Avoid font style (e.g., bold)
  - Title Font (>28 pt)
  - Main text font (>18 pt)
  - Subordinate font (>18 pt, 2-4 pts smaller)

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Avoid Death by PowerPoint

- Slide Master Fonts (cont'd)
  - Use no more than main and subordinate lines (two layers)
  - Use consistent size fonts throughout
  - Use filled, unobtrusive bullets
  - Match text and bullet color
  - Use hanging indents

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Avoid Death by PowerPoint

- Design
  - Limit text (six by six)
  - Distinguish slides from documents
  - Avoid transition animations/sounds
  - Avoid extraneous "noise"
  - Use pictures, diagrams & animations before text
  - Connect pictures to content

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Avoid Death by PowerPoint

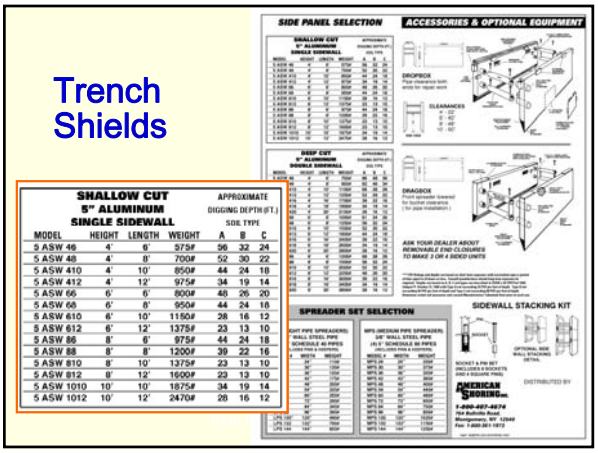
- Planning
  - Simplicity, clarity, and brevity
  - Break content into chunks
  - Plan analog
  - Define objectives
  - Create story
  - Don't read slides

PowerPoint Examples

Irritants and Corrosives Summary

- Methods to detect
- Physical hazards
- Health hazards
- Precautions

Trench Shields



Health Hazards

- Routes of exposure:
  - Inhalation
  - Skin absorption
  - Ingestion

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Imminent Danger

"Any condition where there is **reasonable certainty** that a **danger exists** that can be expected to **cause death or serious physical harm** immediately, or before the danger can be eliminated through normal enforcement procedures"

The World of Chemicals

- Universe of Chemicals > 5 million
- Industrial Inventories - - 55,000
- Regulated Occupationally -- 600

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Definitions

- Protective system
  - "a method of protecting employees from cave-ins, from material that could fall or roll… into an excavation, or from the collapse of adjacent structures."

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Distance Learning

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Examples

- Web
- CD & DVD
- Cell phone
- Television
- Virtual realities
- Webinar
- Telecourse
- Online Course
- iPod
- Videoconferencing

Benefits

- More convenient and flexible
- Reduces training costs
- More cost effective (?)
- Improves learning outcomes (?)
- Decreases instructional time (?)

Benefits (cont'd)

- Improves training consistency
- Allows content to be more easily updated
- Improves access to training
- Avoids need for critical mass of learners

Problems

- Loose visual and audio cues
- Decreases instructor-learner and learner-learner interaction (?)
- Not as effective for below average learners
- Not as effective for unmotivated learners

Problems (cont'd)

- Technical problems can inhibit learning
- Higher upfront costs
- Difficult to do hands-on activities
- Instructor resistance to change

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Distance Learning

- Design
  - Follow PowerPoint design elements
  - Connect pictures to text (time, space)
  - Use conversational style for narration or script
  - Avoid text and narration, especially with graphics

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Distance Learning

- Design
  - Break content into chunks
  - Engage learner with content (quiz, branching)
  - Add feedback

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Summary

1. No significant difference
2. Conversation should be about learning
3. Technology is a tool
4. Technology tends to hinder interactivity – use it carefully
5. Remember the goal

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Summary (cont'd)

6. Consider ADDIE and learning theory first
7. Learning by doing is more effective – Technology tends to get in the way
8. Keep it simple
9. Keep it applied and situated

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Summary (cont'd)

10. You get what you pay for
11. Good instruction is good instruction – with or without technology
12. Some of my best training has been using flip-chart paper and white-board