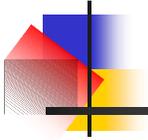# Applying Instructional Design Principles to PowerPoint Presentations

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**Beta Tau Chapter Meeting**
**Business Information Technology Conference - Atlanta**
**November 21, 2004**

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# Agenda

- Why this research?
- Preliminary findings
- Presentation software
- Learning/Instruction design
- Applications of PowerPoint (ABED6128 & InfoSec course)
- Q&A

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# Why this research?

- n To determine how traditional learning theories can be applied to computer/web based instructional design
- n To fill gaps in technology-based instruction
- n To determine if existing course material can be made more effective as a result of this research
- n To assist with course development
- n Article published in Journal of Instruction Delivery Systems, 18(2), 24-33.

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# ABED 6128
# Instructional Strategies

- n Active Learning Principles
- n Case Studies
- n Web Based Education
- n International Issues/Current Events
- n Keller's ARCS theory (Motivation)
- n Reigeluth's Elaboration Theory
- n Multimedia Use in Instruction
- n Group Final Project (Interactive Web Module)

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# Information Security Course

- n "Security and Control of Information Systems"
- n Offered at Univ. of Maryland (1998-2003)
- n MBA Elective
- n Students from different backgrounds (programmers, finance, accounting, medicine, government)
- n Course focus more on Management and Business aspect of Information Security
- n Strategy, policy, planning, technology etc.

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# Preliminary Findings
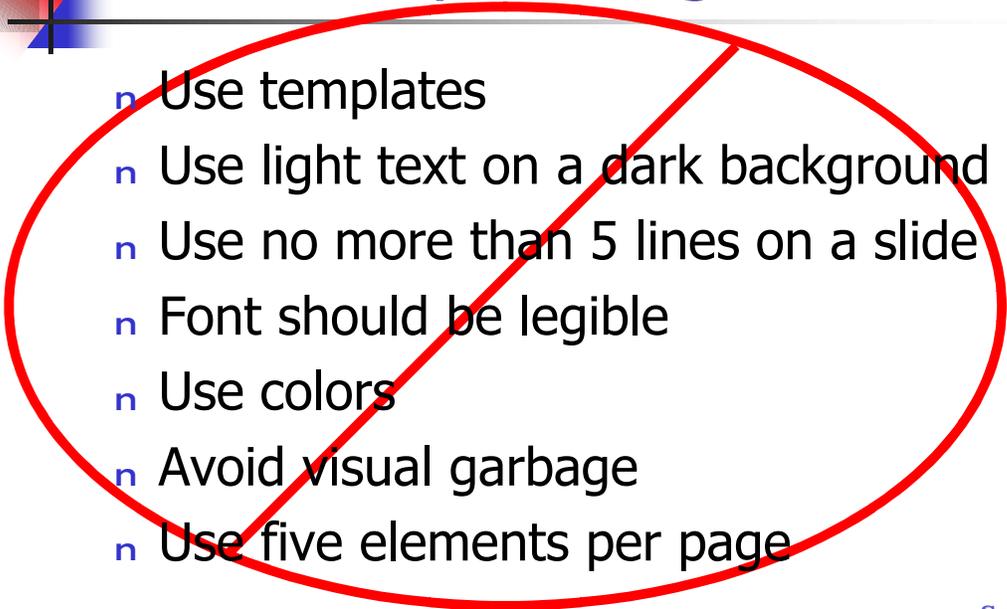
- n Use templates
- n Use light text on a dark background
- n Use no more than 5 lines on a slide
- n Font should be legible
- n Use colors
- n Avoid visual garbage
- n Use five elements per page

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# Research Objectives

- n A deeper level of understanding of the process of technology-assisted learning and use of instructional design principles to facilitate learning
- n Which theories are most appropriate and how can they be used
- n How can instructional design in PowerPoint be optimized to maximize learning and achievement
- n Increase pedagogical understanding of presentation tools

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# Technology-assisted Presentation Software

- n Example: PowerPoint

- + Easy to use
- + Feature rich
- + Industry standard

- - Easy to use
- - Message lost in medium
- - Follows 90 / 10 rule

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# Types of Presentations

1. Information only. No interaction
2. Self-paced presentation (kiosk)
3. Supplementary presentation based on previously distributed notes (class)
4. Presentation with audience interaction (Bruner's Discovery learning)
5. Presentation + Assessment

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# Learning Theories
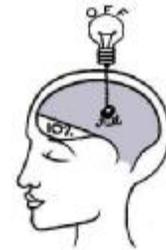
- **Behaviorist**
  Observes changes in behavior that can be measured. Stimulus-Response. *Aristotle, Pavlov, Thorndike, Skinner.*

- **Cognitivist \*\***
  Focus on thought process behind behavior and what happens in learner's mind. Use of schema (internal knowledge structure) as a result of examples, analogies, metaphors, tutorials. *Gagne, Gardner. Keller, Reigleuth.*

- **Constructivist**
  Students construct own perspective of world through experience, mental structure, and beliefs that are used to interpret objects and events. *Vygotsky, Piaget, Bruner,Jonasson.*

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# Instructional Design
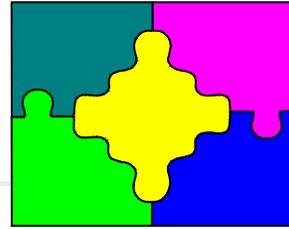
- n <u>Motivating</u> the learner, identifying what is to be learned, <u>reminding</u> learners of past knowledge, providing instructional material, requiring <u>active involvement</u>, providing guidance and <u>feedback</u>, testing comprehension, and providing <u>enrichment</u> are common elements of an interactive learning unit.

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# ID Principles

- n "Proper sequencing of instruction is important to learning" (Kemp, 1985)
- n "Students prefer to learn in an environment that reflects cognitive style they are most comfortable, and also when instructional method used matches the student's learning style (Gordon, 1995)
- n Gagne's sequencing of instruction (based on Information Processing Learning theory)

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# Bloom's Taxonomy of Learning


Web Browser  Firewall  Web Server
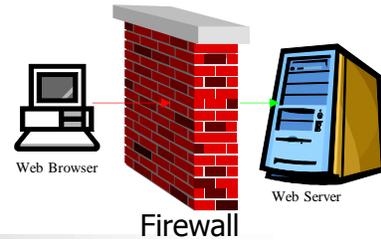
- n **Knowledge**: Define the term 'Firewall'
- n **Comprehension**: Explain how firewalls work at the Application layer of the7-layer OSI model.
- n **Application**: Illustrate through examples, benefits of having a firewall outside versus inside network perimeter
- n **Analysis**: Compare/contrast features of two firewalls made by different vendors
- n **Synthesis**: Propose a firewall setup for an online bank
- n **Evaluation**: Compare results of intrusions between pre and post firewall periods

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# Elaboration Theory
(Reigeluth, 1992)

- n Teaches sequences and cause-effect relationships
- n Builds on Ausubel's use of Advanced Organizers
- n Instruction should be organized from simple to complex sequence to provide better retention and motivation in learners
- n Example: Use PowerPoint 'builds' to show hierarchy of access controls in databases
- n Broad context to focused application represents "cognitive zoom" for the learner to absorb information using cognitive strategy activators.

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# Constructivism & PowerPoint

- Group interaction, Shared workspace
- Embed learning in relevant context, encourage use of multiple modes of representation
- Include visual stimuli such as tables, charts, scanned images
- Use PowerPoint as a presentation platform for remote sites

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# Multimedia


Duncan Giles
Andersen Legal

- Based on Dual Coding Theory (Paivio, 1991)
- Memory has 2 separate codes for processing information: Verbal & Visual
- Interconnection allows dual coding of information
- 3 levels of processing
  *Representational Processing* – activation of one type of code by stimulus
  *Referential Processing* – cross activation between either system
  *Associative Processing* – activation of additional information within either system

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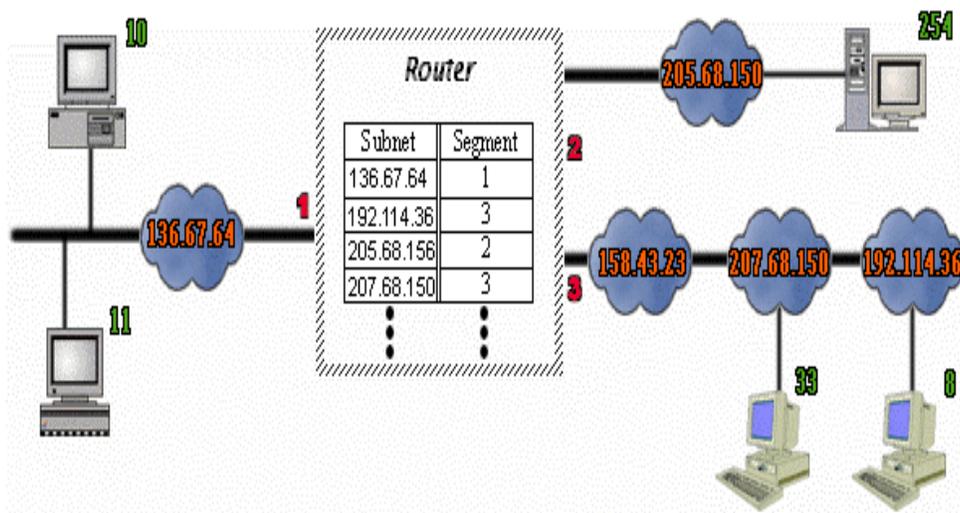STATE UNIVERSITY of
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# Router

- n Router examines packet and looks for destination address
- n Compares address to segment information in table and forwards packet
- n Optimize Routing Path using routing algorithm
- n Must be robust to perform critical operations
- n Adapt quickly to network delays
- n Switch packet to next hop for further transmission

*Source: http://www.rad.com/networks/1997/nettut/router.html*

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# Router (Animation)

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# Video

What role does technology play in today's organizations?
Carly Fiorina, CEO of HP

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# Other strategies...

- n Use of 'Question Slides'
- n Use of Quizzes for feedback
- n Hyperlinked elements
- n Integration of external programs

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# Author's Note

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