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Effective Learning with Multi-Media

In this presentation, learners will review eight principles of *Multi-Media Learning*

Created by Keith V. Bletzer, Editorial Board
*Anthropology-Open Access Journal*
Multi-Media Learning (2001)
Richard E Mayer proposes:

3 foundations (multi-media)
2 cognitive stressors
3 steps into memory
3 assumptions (cognition)
3 foundations (multi-media)

Intelligibility and Plausibility

‘Compatible’ and ‘Consistent’ with how people learn

Applicability fits with multi-media
2 cognitive stressors

Intrinsic Cognitive Load: inherent difficulty of material

Extraneous Cognitive Load: how the message is designed
3 steps into memory

**Selecting**: attends to relevant words and pictures, especially core items & main steps

**Organizing**: builds *internal* connections, creates coherent model (verbal or pictorial)

**Integrating**: builds *external* connections with coherent model *and* prior knowledge
3 assumptions (cognition)

Paired Channels
Visual and Auditory

Limited Working Memory
5 to 7 items, or 5 to 7 chunks (items)

Active Processing
Attend to input
Organize it -- Integrate it
This is more work...

Printed Text

Words (to Ears) → Sounds (to Verbal)

Eyes (to Images)

Selecting

Organizing

Prior Knowledge

Lesson

Sensory Memory

Working Memory

Long-Term Memory
Multi-Media Model

Paired Presentation

“Narration” & “Animation”
One Channel

Narration

Words → Ears → Sounds → Verbal

Pictures → Eyes → Images → Pictorial

Lesson → Sensory Memory → Working Memory → Long-Term Memory

selecting → organizing

Prior Knowledge
One Channel

Words → Ears → Sounds → Verbal

Animation

Pictures → Eyes → Images → Pictorial

selecting → organizing

Lesson → Sensory Memory → Working Memory → Long-Term Memory

Prior Knowledge
Multi-Media Model

Dual Channels

“auditory” and “visual”
This is less work...

- **Narration**
  - Words → Ears → Sounds → Verbal
  - Pictures → Eyes → Images → Pictorial

- **Selecting**
- **Organizing**

- Lesson
- Sensory Memory
- Working Memory
- Long-Term Memory

- Prior Knowledge
One learns better when words and picture appear near each other, than words alone

• Words and pictures together encourage verbal and pictorial mental models; assist making mental connections between them

• Narration = Words & Animation = Pictures
One learns better when related pictures & words are presented spatially near, not far, and not on top of visual words and pictures together are held in working memory; focus attention better; and reduce need “to search” page/screen.
One learns better when words and pictures are presented simultaneously, rather than successively.

Bits (chunks) of narration and animation are held in working memory more easily; encourage mental connections between verbal and visual representations.

Temporal Contiguity
One learns better when extraneous stuff is excluded, rather than included.

Extraneous stuff competes for energies in working memory; diverts focus from core idea & moves into inappropriate themes; disrupts organizing the material cognitively.

**Coherence**
Chunking is placing items in memory boxes for meaningful cognitive tasks. Each box contains chunks of information that help in retaining and processing data more efficiently.
Better
Chunking is bunching together for meaningful cognitive tasks.
IN THIS EXAMPLE
Coherence is increased through enhanced spatial proximity and enhanced temporal contiguity;
Animated text is used, no narration;
Extraneous text/animation is removed.
One learns better from animation and narration, than animation and on-screen text

• Words through auditory/verbal channel are more easily processed, which leaves open visual/pictorial channel (prevents “jumble”)
• More effective if spoken, than printed text
One learns better from animation and narration, than animation/narration with text

- Pictures & words together (animation/text) can sometimes overload the visual channel.
- More effective to teach thru two channels, that is, *Auditory* and *Visual*

**Redundancy**
Viceroy Butterfly (tastes good)
Monarch Butterfly (tastes bad)
Viceroy  Monarch

Mimicry means “to copy” an appearance for self-protection. Think of yourself walking down the street of a strange neighborhood. If you “dress” like most the people around you, you will be “safer.”

Our lesson today is **Natural Selection**.
Better
Protective Coloration preserves “bad,” mimics “good”
IN THIS EXAMPLE
Coherence is increased through enhanced spatial proximity;
Extraneous text is removed;
Printed text is separated from visual, but could be replaced by brief narration;
No animation is used, would be extraneous.
Design effects are stronger for low-knowledge & high-spatial, than those learners who are high-knowledge & low-spatial.

High-knowledge learners use prior ideas to compensate poor guidance; high-spatial integrate visual/verbal images more easily; low-spatial require extra effort with images which detract from grasping visual / verbal Individual Difference.
Moderate arousal produces situation of greater learning than high or low arousal

Scare tactics, abrasive punishment, extreme threats and forceful put-downs do not generate conditions that are ideal for effective learning

- Lancy and Grove (2010)

Positive Environment
What makes good multi-media?

- Mixed modalities -
- Simultaneous elements -
- Integrated meaningful structures -
- Concise -

What should one aim for?

- Conceptual, not topical relevance
- Focused, not split attention
Credits

  (Cambridge, MA: Cambridge University Press)

  “SMART, SMARTer, SMARTTest,” Teaching Workshop Presented at Annual Conference, Arizona Technology in Education Association Vail, Arizona, October 29, 2012

  “Language Play,” 2009, Don L.F. Nilsen and Alleen Pace Nilsen, Department of English, Arizona State University, Tempe, Arizona


  Butterfly pictures: Paul B. Sutherland and William T. Hark ([google.com](http://google.com))

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Not

THE END