

The Strengths & Weaknesses of Instructional Media

May 17, 2010



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Session Overview

I. Neural Networks Recap

II. The Virtues & Barriers of Print



III. The Virtues & Barriers of Images



IV. The Virtues & Barriers of Lectures (Audio)



Neural Networks



Neural Networks

- Meaning is constructed “heterarchically” from the interplay of sensory information, perceptual constancies and cognitive experience.
- Processing is distributed
- Processing is distributed in parallel

Neural Networks

- Recognition Networks
 - Recognition cortex (sensory –perceptual cortex in the posterior neocortex) is composed of neural networks adapted to recognize regularities in the environment.
 - Recognition cortex does not “respond” to these regularities, it generates them (top down affects bottom up)

Neural Networks

- The Kofka Ring



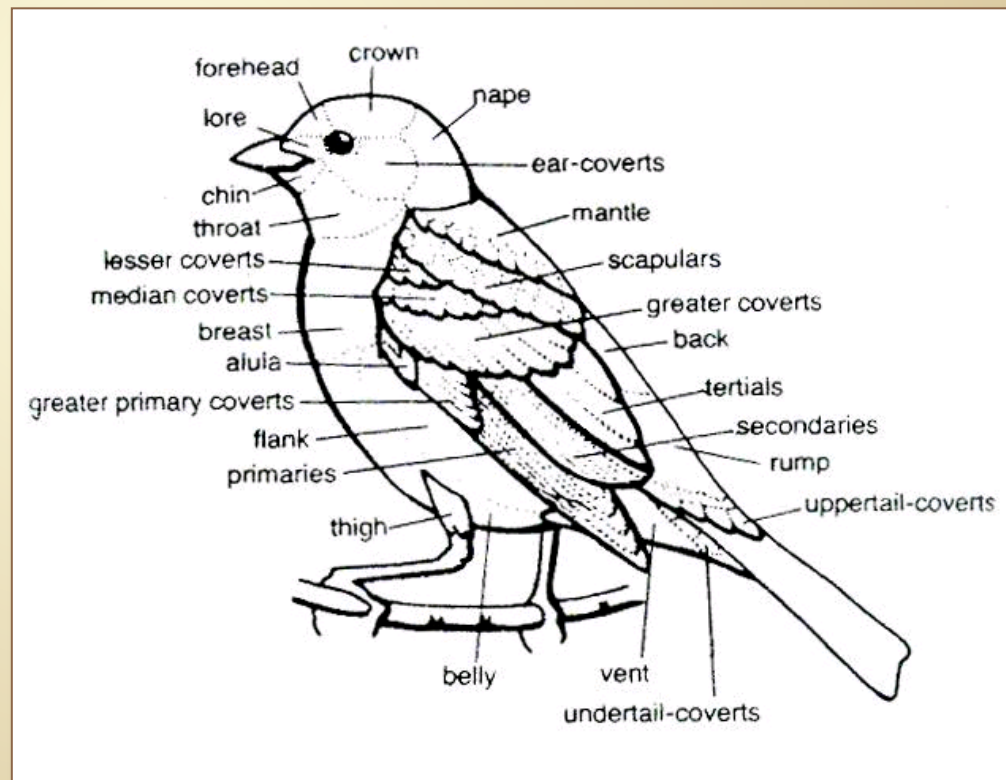
In the presence of the vertical “ bar”, the brightness difference without luminance difference is a standard case of simultaneous contrast. This is probably due to retinal mechanisms. Without the bar, filling-in (a cortical phenomenon) ‘wins’.

Neural Networks

- Recognition Networks
- Perception, memory and learning are all processes of categorization – all of them require lumping dissimilar things together.
- Perception, memory and learning are all processes of generalization – all of them generalize from some things to others

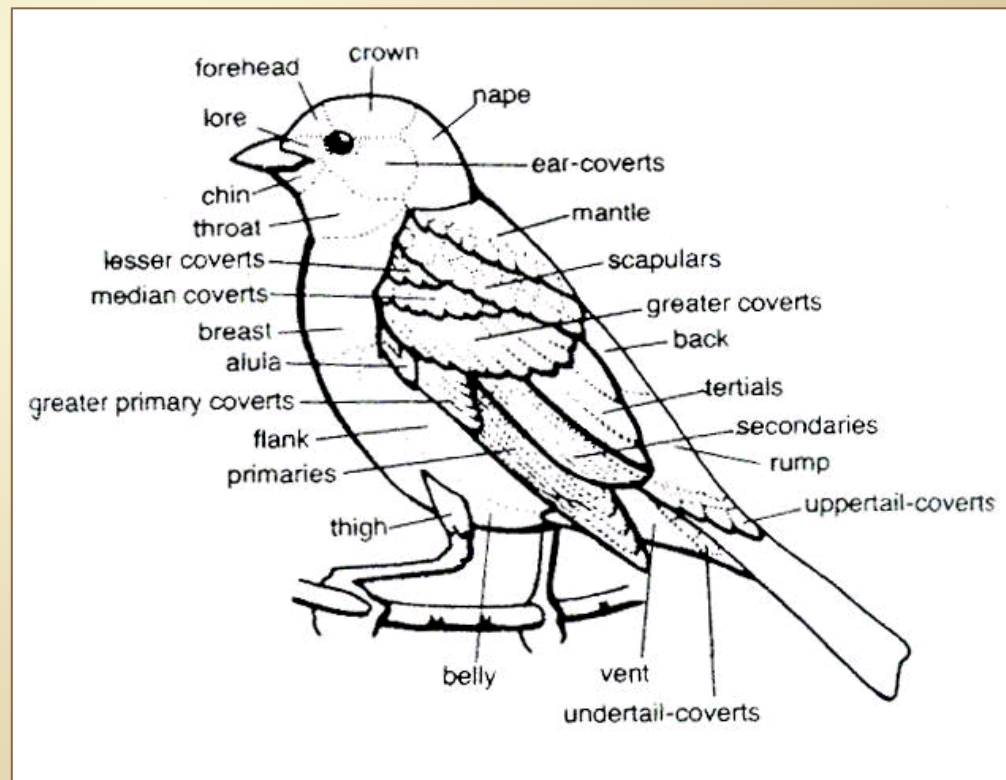
Neural Networks

- Recognition Networks
 - What are the characteristic s of a bird?



Neural Networks

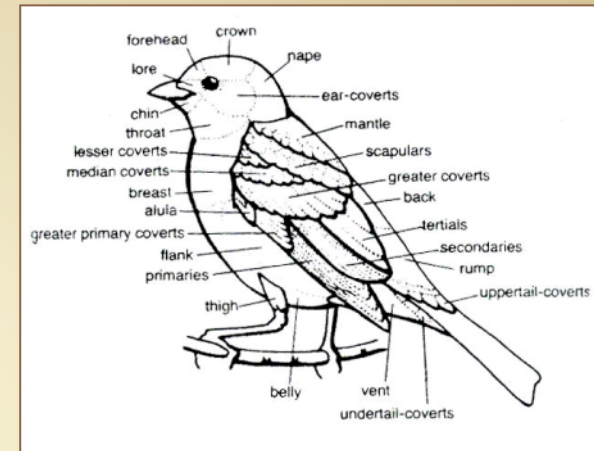
- Recognition Networks
 - Characteristics of a bird?
 - Flight?
 - Feathers?
 - Two legs?
 - Beak?



Neural Networks

- Recognition Networks

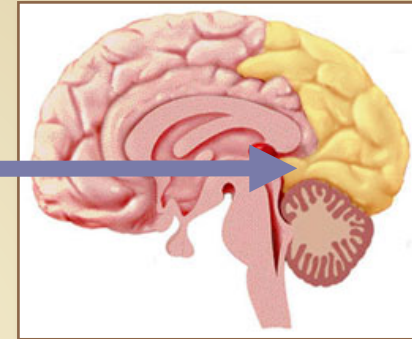
- Characteristic s of all birds ?



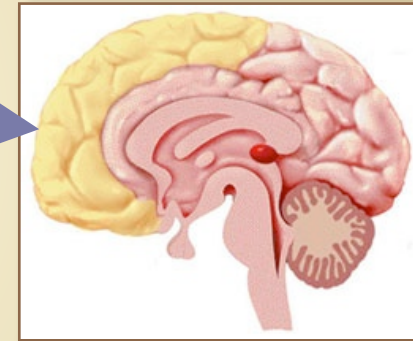
1. They are endothermic vertebrates.
2. Their skin is covered with feathers.
3. They have four-chambered hearts
4. Their bones are lightweight and usually hollow.
5. Their forelimbs are modified as wings.
6. They lay eggs.

Principles of UDL

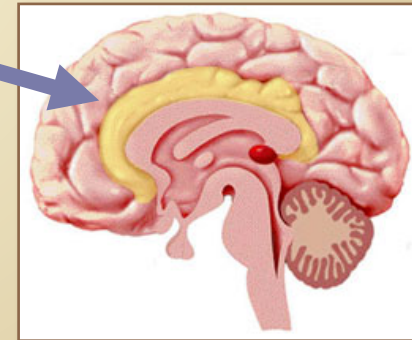
- Multiple Means of Representation



- Multiple Means of Expression



- Multiple Means of Engagement



I. The Virtues of Print



?

I. The Virtues of Print



- Simultaneous presentation of patterns:
 - Visual patterns
 - Phonological patterns
 - Sound/Symbol patterns
 - Semantic patterns

I. The Virtues of Print



- Simultaneous presentation of patterns:
 - Visual patterns

According to research at Cambridge University, it doesn't matter in what order the letters in a word are, the only important thing is that the first and last letter are in the right place. The rest can be a total mess and you can still read it without problem. This is because the human mind does not read every letter by itself, but the word as a whole.

I. The Virtues of Print



- Simultaneous presentation of patterns:
 - Phonological patterns

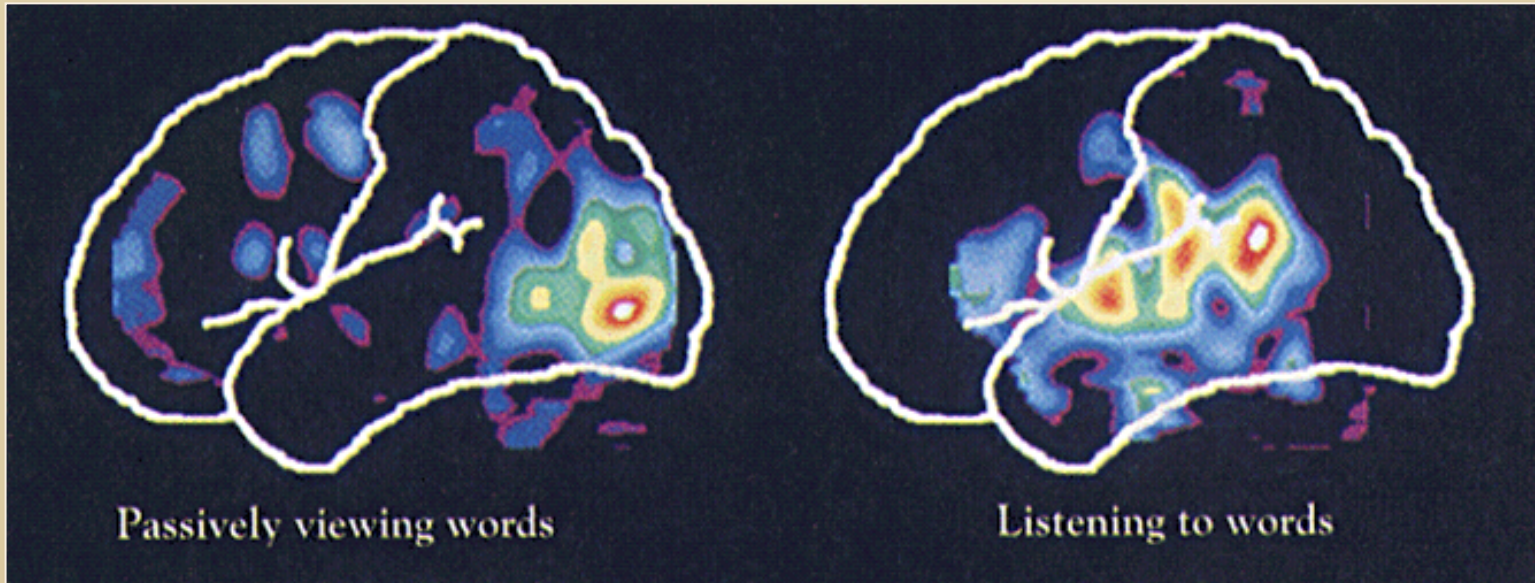
Phonological Awareness is a major component of skill in beginning readers and points to a developmental trajectory by which written language engages areas originally shaped by speech for learners on the path toward successful literacy acquisition.

Frost SJ, Landi N, Mencl WE, Sandak R, Fulbright RK, Tejada ET, Jacobsen L, Grigorenko EL, Constable RT, Pugh KR. (2009)

I. The Virtues of Print



- Simultaneous presentation of patterns:
 - Phonological patterns

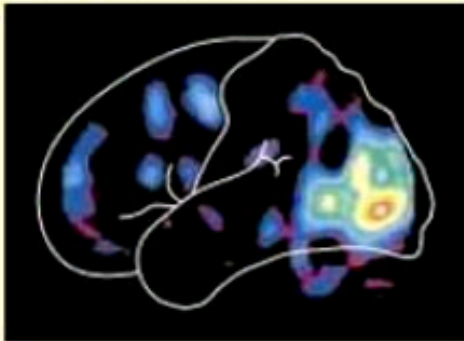


I. The Virtues of Print

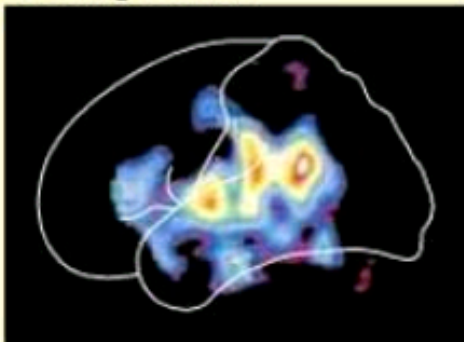


- Simultaneous presentation of patterns:
 - Phonological patterns

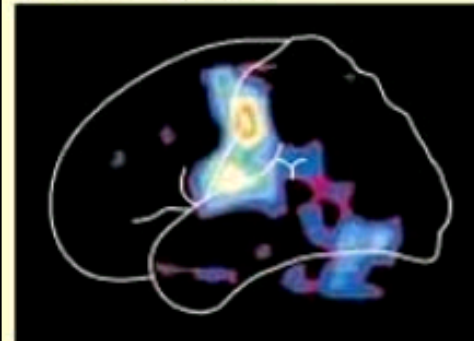
Seeing words passively



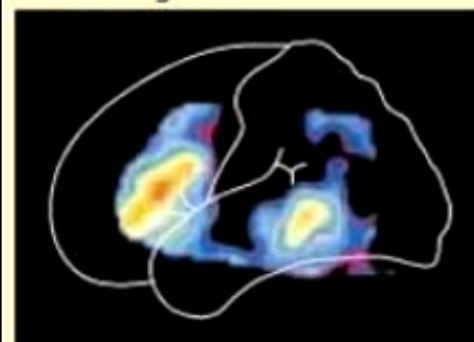
Listening to words



Pronouncing words



Generating words



I. The Virtues of Print



- Simultaneous presentation of patterns:
 - Sound/Symbol patterns

Photi = Fish

I. The Virtues of Print



- Simultaneous presentation of patterns:
 - Sound/Symbol patterns

Photi = Fish

"Ph" as in phony

"ti" as in action

"o" as in women

I. The Virtues of Print



- Simultaneous presentation of patterns:
 - Semantic patterns
 - “She Struggles with the adversities of her day-to-day existence”
 - “She Problems many!”

I. The Virtues of Print



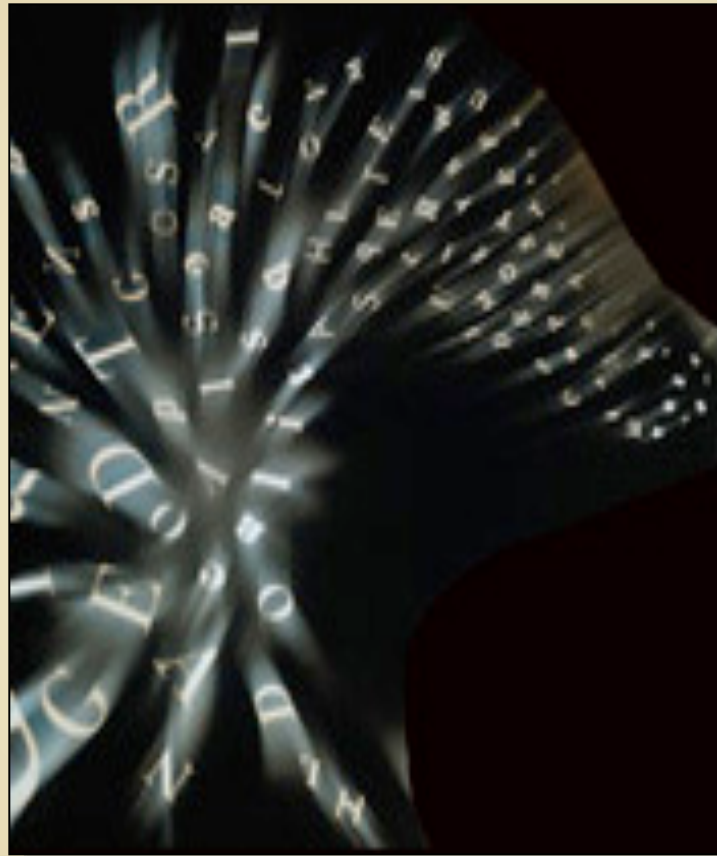
- Simultaneous presentation of patterns:
 - Semantic patterns
 - “She Struggles with the adversities of her day-to-day existence”
(Standard written English)
 - “She Problems many!”
(American Sign Language)

The Barriers of Print



1. What happens if some patterns are hard to recognize?
 - Visual patterns (Blind/Low Vision)
 - Phonological patterns (Deaf/Hard of Hearing; ESL)
 - Sound/Symbol patterns (Dyslexia)
 - Semantic patterns (ADHD; Low Cognition; English as second language)

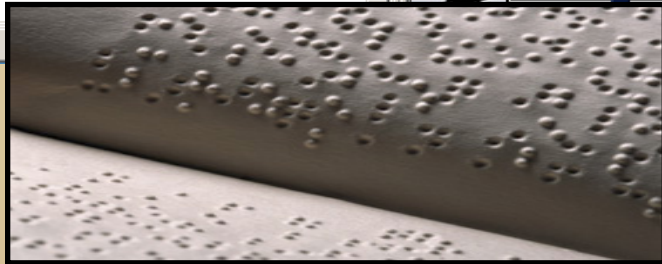
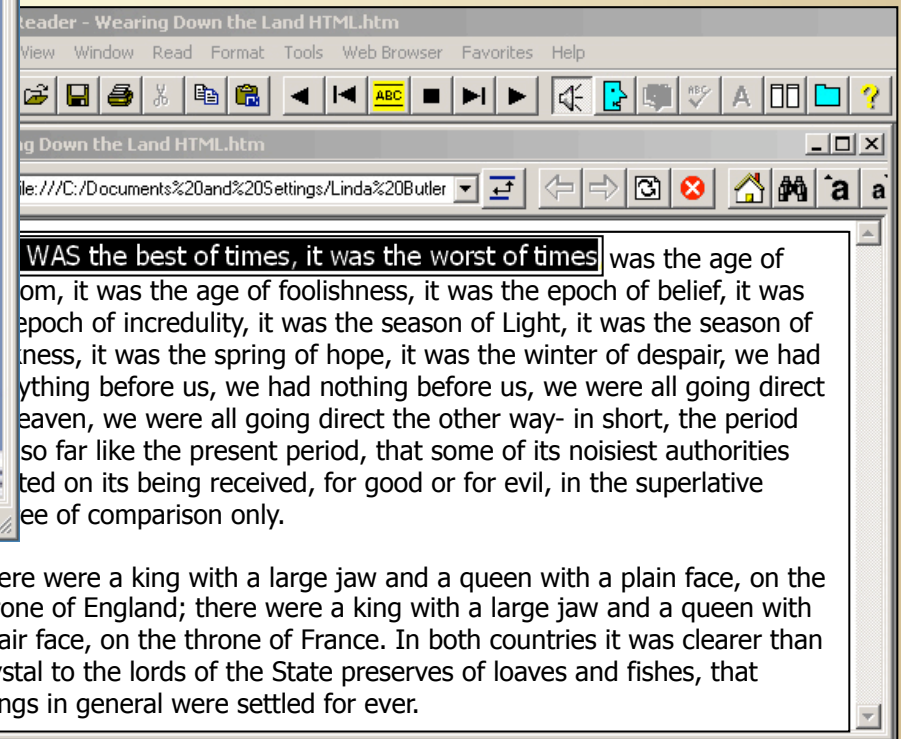
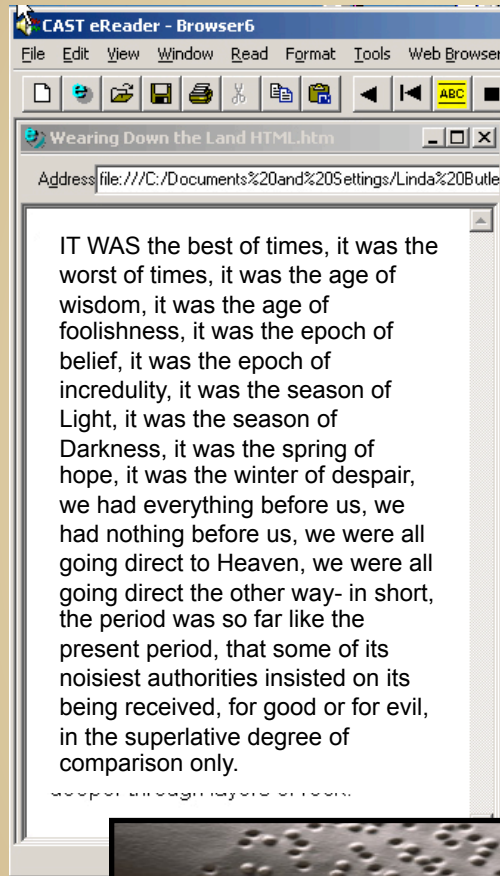
The Benefits of Digital Media



Representation

Tale of Two Cities

...It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness,



There were a king with a large jaw and a queen with a plain face, on the throne of England; there were a king with a large jaw and a queen with a fair face, on the throne of France. In both countries it was clearer than crystal to the lords of the State preserves of loaves and fishes, that things in general were settled for ever.

Expression



1. Students need strategies to extract meaning:
 - Models – Examples & non-examples
 - Highlight critical features
 - Highlight critical relationships

Expression

- No Flexibility for support



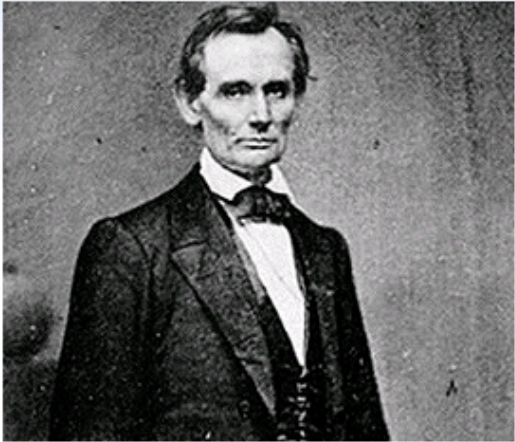
Expression



- Digital media allows for embedded strategy support

Speech

The Gettysburg Address



Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.

Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure. We are met on a great battle-field of that war. We have come to dedicate a portion of that field, as a final resting place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this.

Stop and Think!

Level 1 2 3 X

Predict *Reading Strategy*

Choose the best prediction based on text clues and your knowledge. Click 'Show' to see the clues that helped the coaches predict. Click on the coaches for help.

- ☐ I predict Lincoln's speech will emphasize the connection between the battle of Gettysburg and the founding principles of the United States.
- ☐ I predict Lincoln will tell a detailed story about the Founding Fathers' lives.
- ☐ I predict Lincoln's speech will be about the origins of the word 'liberty.'

Click "Show" to see the clues that helped the

Expression

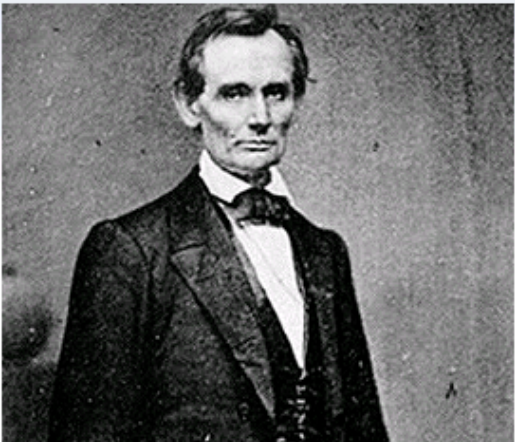


- Digital media allows for embedded strategy support



Speech

← Page 1 →

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Go to page: of 2 →

← Page 1 →

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Level 1 2 3 x

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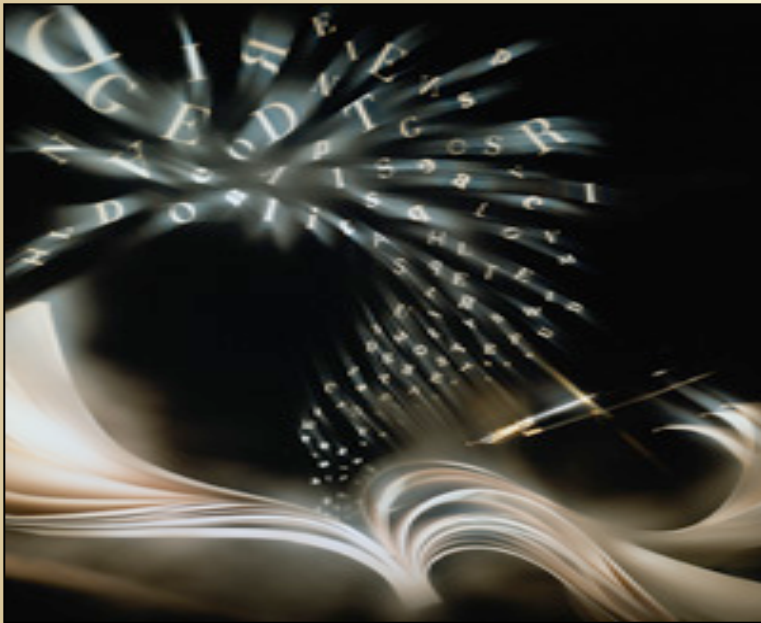
Hide

Click on the Coaches for help.

Engagement



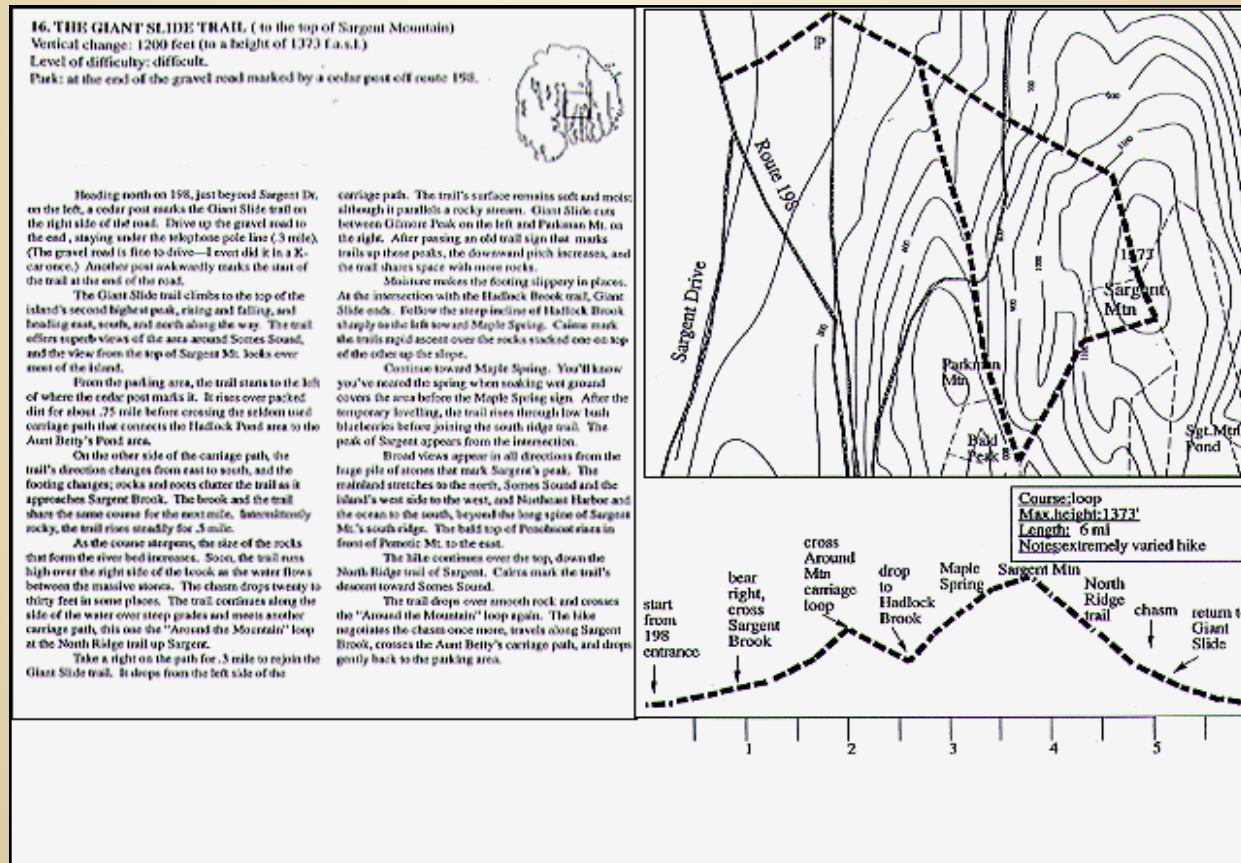
- Digital media allows for choices:



- Adjustable challenge & support
- Content & tools
- Context

II. The Virtues of Images

- What are images good for?



II. The Virtues of Images

- What are images good for?

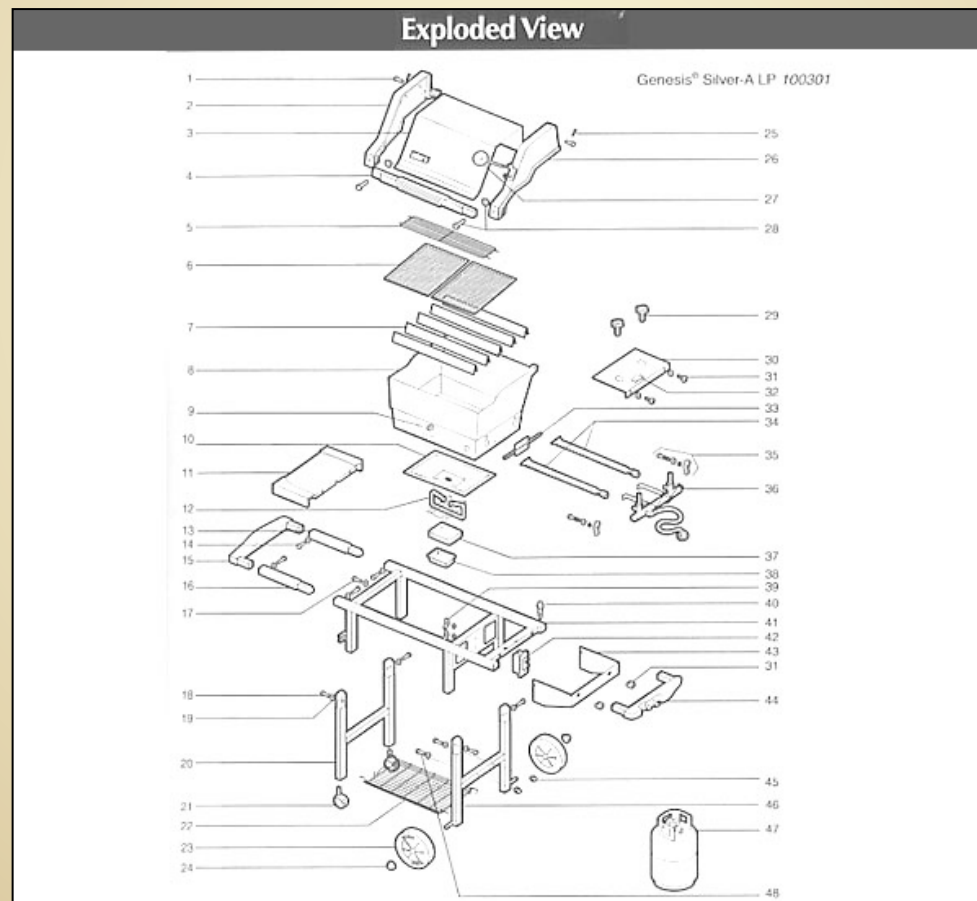
?

II. The Virtues of Images

- What are images good for?
 - 1) Representing concrete objects and the spaces between them.
 - 2) Representing the relationships between objects: illustrating or capturing their relationships
 - 3) Representing context: capturing objects in actual context, maintaining figure and ground.
 - 4) Capturing Simultaneity: e.g. parts and wholes simultaneously.

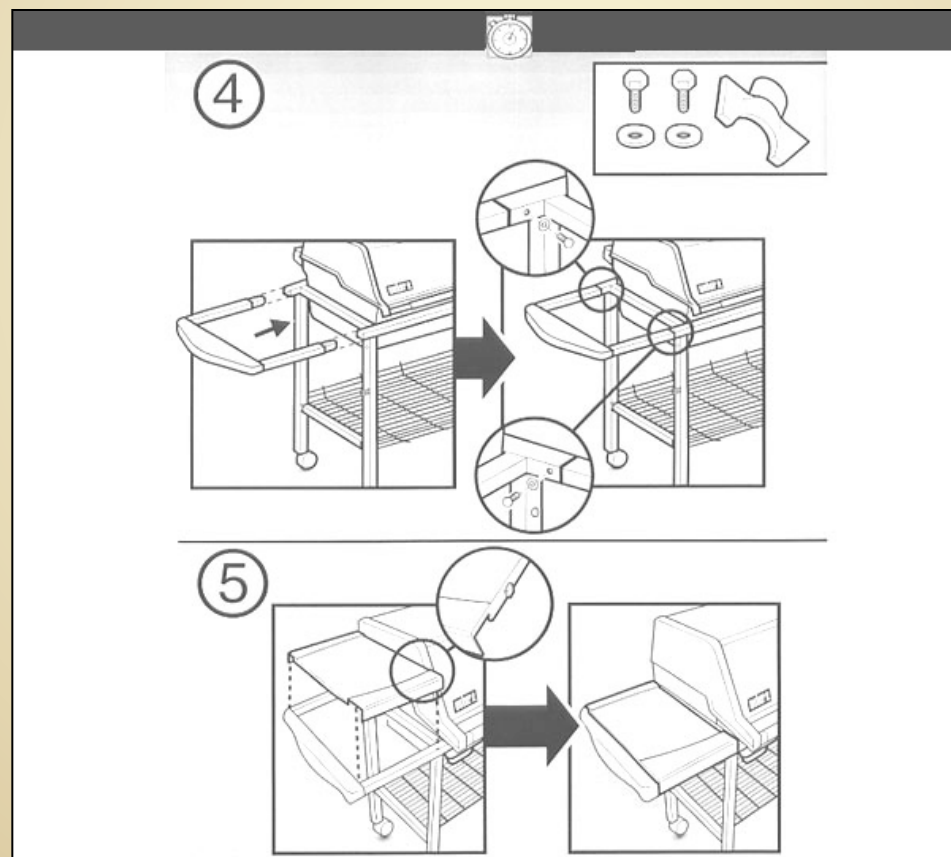
II. The Virtues of Images

- What are images good for?



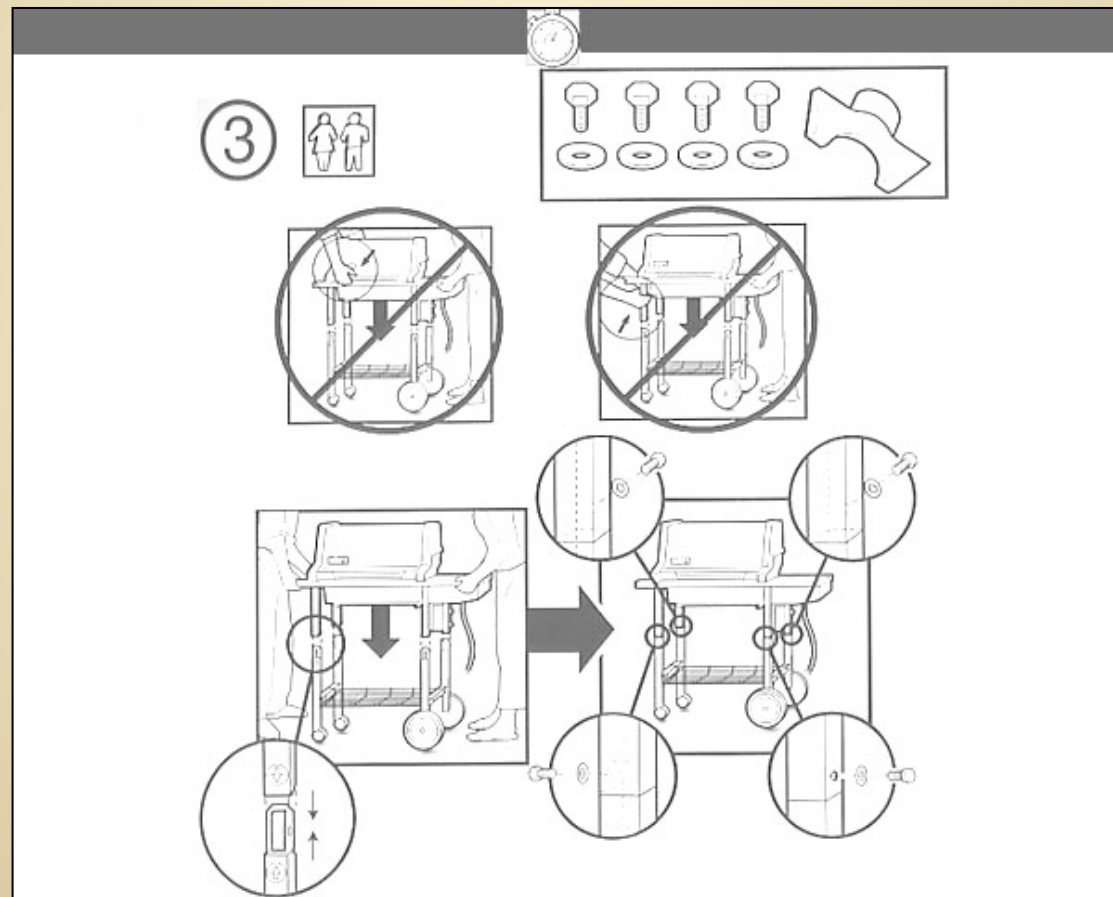
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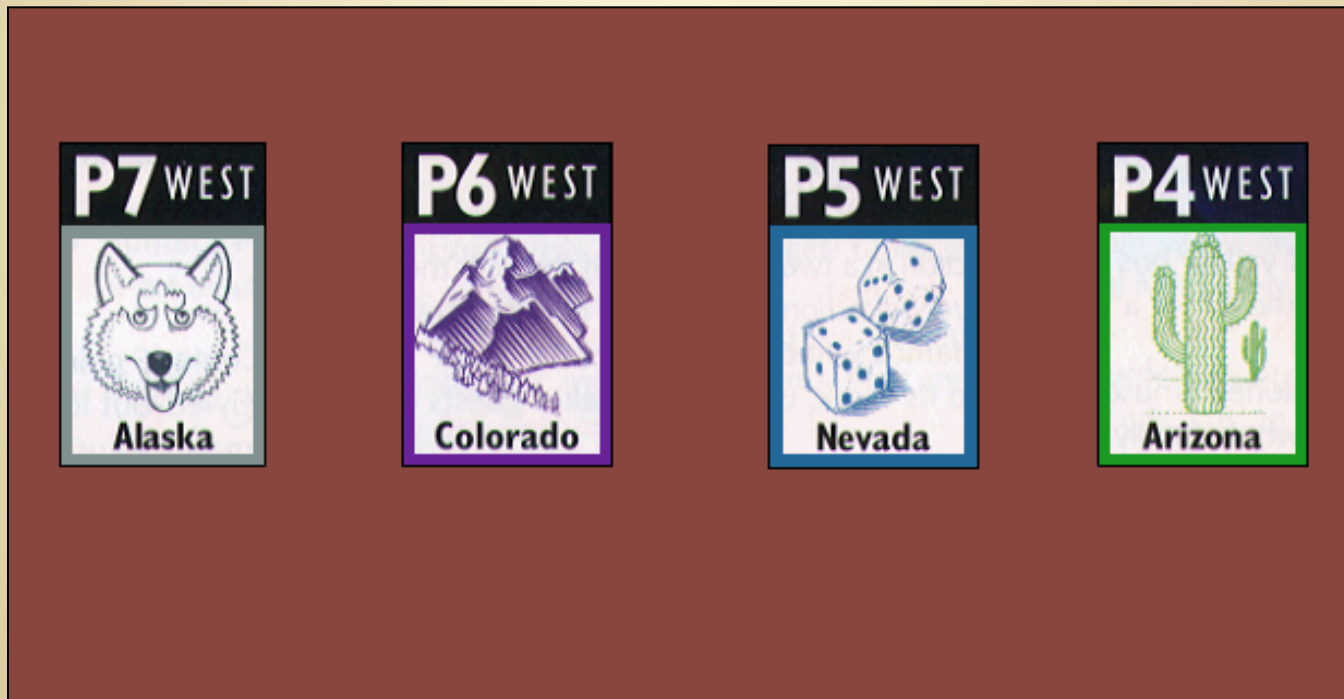
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II. The Virtues of Images

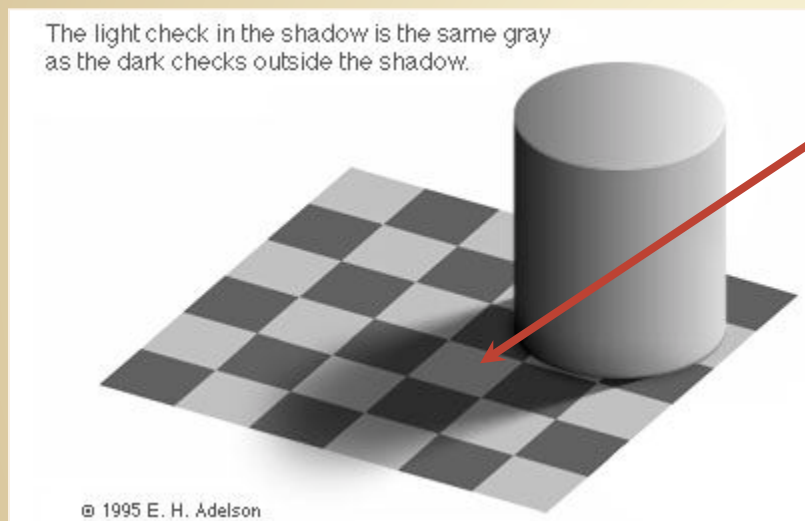
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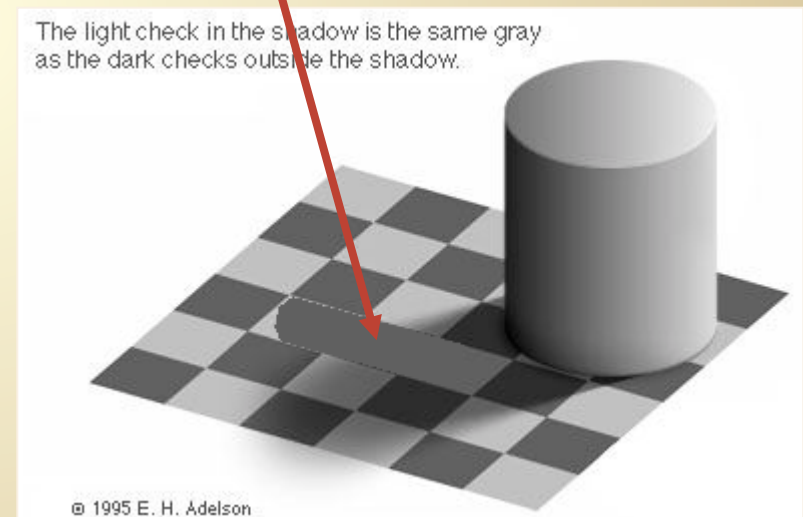
- Representing concrete objects and the spaces between them
- Representing the relationships between objects—illustrating or capturing their relationships
- Representing context—capturing objects in actual context, maintaining figure and ground
- Capturing simultaneity, e.g., parts and wholes simultaneously

II. The Barriers of Images

- What challenges do images present to the learner?



“Top Down” constraints (What your brain thinks “ought” to be there)



II. The Barriers of Images

- What challenges to images present to the learner?



Clinton and who??

II. The Barriers of Images



- What challenges do images present to the learner?
 - Sensory (vision)
 - Perceptual (interpretative)
 - Cognitive (understanding)

Representation

- Text Equivalents

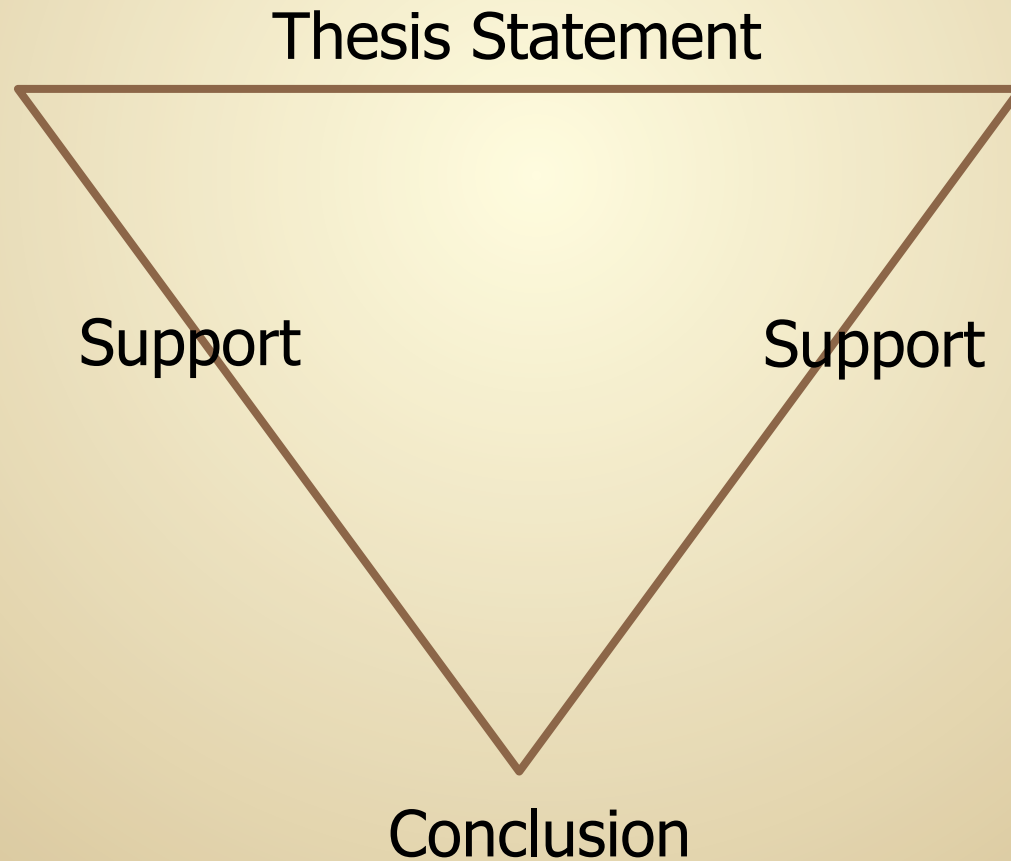


This black and white photo shows a makeshift home during the Depression. Two clotheslines are strung across the center of the picture in front of a wooden shed. Three children play on the ground in front of the shed and beneath the clothes hanging from the clotheslines. A small table with a large wooden bucket can be seen on the left. The ground is dirt or sand and is littered with scraps of wood and metal, baskets, and other debris. A leafless tree can be seen in the background on the left.

Expression

- **To Write, Draw** (Weir, R., *Inside Higher Ed*, 3.3.2010)

http://www.insidehighered.com/advice/instant_mentor/weir21



Engagement

- The power of color



Engagement

- The power of color



Engagement

- The power of color



Engagement

- Evoking emotion



III The Virtues of Lectures (audio)



III The Virtues of Lectures (audio)



?

III The Virtues of Lectures (audio)



- The power and flexibility of the human voice and its accompaniments – salience, emphasis, etc.
- Feedback and the wisdom of the crowd
- Amplification and the contagion of the crowd

III The Barriers of Lectures (audio)



- Uniform Means of Representation
 - memory load
 - executive load
 - implicit structure
 - background knowledge
- Uniform Means of Expression
 - passivity
 - lack of interaction
 - lack of construction
 - impermanent
 - linear only
- Uniform Means of Engagement
 - recruiting interest
 - maintaining attention
 - rewarding success

Representation

What the pros say—

- Understand the audience
- 20 minutes—max! (except if interspersed with other media)
- Organization: Power. Punch.



Representation

Offer Alternatives:

- Audio amplification; multimedia
- Concept maps; structural scaffolds
- Visual & audio recording
- Guided notes
- Timer/pacing indicator



Expression

Offer Alternatives:

- Interpreting Q & A (large group)
- Follow-up discussion (small group)
- Assigned Note-takers
- Online discussion forums
- Office hours



Engagement

Only connect—

- The primacy of questions
- The power of personal anecdote
- Affect, not data
- Eye contact



On Speechmaking



- What the pros say...
 - 1) Pnch
 - 2) One theme
 - 3) Wait
 - 4) Ear – conversational
 - 5) Retention – Loop back

On Speechmaking



- On PowerPoint
- An Aside on PowerPoint:

....PowerPoint can give visual shape to an argument. “Language is a linear medium: one damn word after another. But ideas are multidimensional... When properly employed, PowerPoint makes the logical structure of an argument more transparent. Two channels sending the same information are better than one.” Parker, New Yorker, May 28, 2001.

On Speechmaking



- On PowerPoint

- An Aside on PowerPoint: from Clifford Nass at Stanford

..... PowerPoint lifts the floor of public speaking: a lecture is less likely to be poor if the speaker is using it. What PowerPoint does is very efficiently deliver content. What students gain is a lot more information – not just facts, but rules, ways of thinking, examples.

On Speechmaking



- On PowerPoint
- An Aside on PowerPoint: from Clifford Nass at Stanford

..... But.... PowerPoint lowers the ceiling. What you miss is the process. The classes I remember most, the professors I remember most, were the ones where you could watch how they thought. You don't remember what they said, the details. It was "what an elegant way to wrap around a problem! PPT takes that away. PPT gives you the outcome, but it removes the process."

On Speechmaking



- On PowerPoint
- An Aside on PowerPoint: from Clifford Nass at Stanford

..... "PPT empowers the provider of simple content, but it risks squeezing out the provider of process – that is to say the rhetorician, the storyteller, the poet, the person whose thoughts cannot be arranged in the shape of an auto content slide."

It takes away risk, spontaneity, and the "danger" of new ideas on the fly.

On Speechmaking

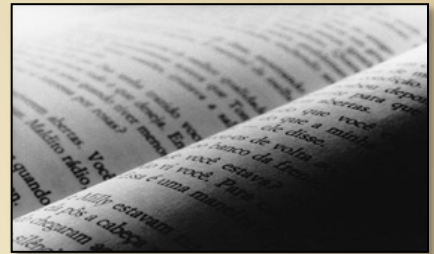


- Death by PowerPoint
 - 1) Never begin or end with slides
 - 2) Don't read word slides
 - 3) Tell and show rather than show and tell
 - 4) Don't turn lights off
 - 5) Use blanks (like silences)
 - 6) One image per concept
 - 7) Graphics for good news, tables for bad

Session Summary

I. Neural Networks Recap

II. The Virtues & Barriers of Print



III. The Virtues & Barriers of Images



IV. The Virtues & Barriers of Lectures (Audio)



A Resource

- The UDL Guidelines

I. Provide Multiple Means of Representation

Perception

Language and symbols

Comprehension

II. Provide Multiple Means of Action and Expression

Physical action

Expressive skills and fluency

Executive function

III. Provide Multiple Means of Engagement

Recruiting interest

Sustaining effort and persistence

Self-regulation

<http://www.udlcenter.org/aboutudl/udlguidelines>