Scaffolding Systems for Numeracy
Building & Transforming Numeracy Skills, Concepts & Habits of Mind

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ABSPD Institute 2010
“educational staging for personal and cultural change”
http://faculty.rcoe.appstate.edu/spagnolojt/scaffold_systems_ABSPD.pdf

Wednesday, June 2, 2010
Session Goals
(Explanation and Rationale; the “I DO.”)

- Explore “system thinking” as a meta framework.
- Develop a personal notion of (framework) and model for, numeracy development.
- Recognize and categorizes scaffolding for “explicit instruction.”
- Synthesize learning principles and models and share a numeracy mission statement.
System Thinking
Input--Transformation--Output
A perspective for:

- Learning systems with a path in a chosen direction - numeracy
- Learning systems that move us from novice to expert - humans
- Learning community systems - those who hold the ladder, lash the bamboo or a take a trip to the dollar store.
Plan/Input (How do I find the stuff to do/experience/apprentice/study? Reading texts in contexts. Using numerate thinking for real problems.)

Implement/Transformation (How do we do something together/engage in shared work/act/change position/build/measure?)

Share/Output (Talk about what we have done. Adopt as concept/skill/habit or not.)

Reflective debrief to inform the next plan.

"'Thinking about thinking' has to be a principal ingredient of any empowering practice of education" Bruner(p. 19).
A Researched “Explicit Instruction” System in Adult Education

BRAIN-BASED, SYSTEMS THINKING, DOL, UDL

INPUT PLAN - The “I do” part. Clear explanation, convincing rational (background) and models process (think aloud)."

TRANSFORMATION - The “We do” part. Student practice, coaching, feedback (positive sandwich) promoting independence...removing scaffold

OUTPUT - The “You do” part. Knowledge and confidence to do and apply skills/processes, adapt concept and share.

REFLECTION and feedback loops informs a new input action.

Wednesday, June 2, 2010
Learning Involves

- Knowledge networks
- Strategic networks
- Affective networks
Human beings are Living Systems

- Each brain is uniquely organized.
- All learning is physiological.
- The brain/mind is social.
- The search for meaning is innate.
- The search for meaning occurs through patterning.
- Emotions are critical to patterning.
- The brain/mind processes parts and wholes simultaneously.
- Learning involves both focused attention and peripheral perception.
- Learning always involves conscious and unconscious processes.
- We have at least two ways of organizing memory: spatial memory system and a set of systems for rote learning.
- Complex learning is enhanced by challenge and inhibited by threat associated with helplessness.
- Learning is developmental.
What is Numeracy?

NUMERACY IS CULTURALLY BASED AND SOCIALLY CONSTRUCTED.

"The world we have created is a product of our thinking; it cannot be changed without changing our thinking."

(Albert Einstein)
Process Quote Guidelines

- Every group needs a time keeper and a supervisor.
- Take a few minutes to view the quotes.
- Everyone has 60 seconds to speak in turn in response to the video/ statements.
- Everyone else must listen for understanding, without reaction, response or interruption, while each of you express your opinion.
- When everyone has spoken, please discuss your thoughts and reactions as a group.
- What are the important characteristics of numerate behavior issues?
- Supervisors need to be prepared to report out to the larger group the salient features of your discussion and group consensus if one is reached.
Numerate Behavior

"Numerate behavior, they posit, is observed when _______ manage a situation or solve a problem in a real context; it involves responding to information about mathematical ideas that may be represented in a range of ways; it requires the activation of a range of enabling knowledge, behaviors, and processes" (p. 11)

Fill in the “blank” above after viewing: http://www.youtube.com/watch?v=HfoQEUm4drk

Fish or bee?

# Mathematics and Numeracy

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<thead>
<tr>
<th><strong>Similarities</strong></th>
<th><strong>Differences</strong></th>
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Cultural materials for scaffolding (bamboo or dollar store)
We learn from what WE feel is meaningful.
Stuff to explore concepts

Practicing Skills and Coaching
Input, Reception and Representation Scaffolds

for no knowledge, knowledge with gaps or erroneous concepts

- Graphic Organizers
- Models
- Theories/concepts
- Anticipation guides
- The hook
- Visual/Aural means
- Mini-lesson/lecture
- Socratic challenge/questions
Engagement and Experiential Transformation Scaffolds

- Problem solving
- Sleuth
- Classifying
- Comparison Activities
- Debate
- Dialogue
- Consensus building
Tools for Sharing and Expression; Production scaffolds

- Newsletters
- Persuasion
- Arts/Artifacts
- Poster
- Demonstrations

Multiple means for expressing understanding
Intentional explicit action teaching

Leads to....

Intentional action learning

Using.....

Appropriate scaffolds and tools for transformations
## Categories for Scaffolding

<table>
<thead>
<tr>
<th>PHASE/DIMENSION</th>
<th>RB/Narrative Conceptual/Declarative</th>
<th>LB/Computational SKILLS/PROCESS Procedural</th>
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<tbody>
<tr>
<td>Input/Planning/Intuition</td>
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<td>Concrete/Engagement/Experiental</td>
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Numeracy Mission Statement

We believe numeracy ...... and are committed to
My Challenge to You: Design a Personal Learning Model/Systems Approach for Numeracy Instruction for your Context and Culture

Use scaffolds for inputs, transformations and outputs.
References

- Bruner
- Marzano
- Bernie Dodge
- Caine and Caine
- UDL
- Dewey
“It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so.”  Mark Twain