Understanding How Young Children Learn:
Bringing the Science of Child Development to the Classroom
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Refocusing Teaching on Learning

How do we define learning???

What are the elements of learning that need to be there for it to occur?

Learning is...

- The matter of our minds (thinking, becoming aware, imagining, seeing, hearing, hoping, remembering, abstracting, planning and problem solving)
- Deep in our species (desire to take in new information by actively exploring new territory)
- A physical phenomenon (in the sensory systems, as energy from light waves and vibrations in the air is converted into electrical impulses that can be interpreted by the nervous system)
- In the brain (neurons send out neurotransmitters and forge networks of connections)
- In the body (motor patterns are encoded for actions)
- Embedded in the world (life experiences, social interactions and community membership)
Components of Learning

Motivation
Attention
Memory
Cognition
Action

Propellers of Learning

Motivation
Habituation & Novelty
Joining the Community
Confidence
Play

Attention
Self-Regulation
Executive Control
Movement

Memory
Working Memory
Scripts, Schemas & Stories
Mnemonic Devices
Knowledge & Expertise

Cognition
Implicit Learning
Imitation
Emotion

Action
Metacognition
Articulation
Collaboration

Novelty

Learning happens without conscious effort
Confidence

Classic Example: Darley & Latane, 1968

From the Lab:

Confidence Propels Motivation


- Findings
  - Children over-estimate their abilities
  - Try to imitate feats way beyond their grasp
  - Word Recall Memory Test: Less Accurate Predictions = Better Performance

From the Lab:

Visualization Propels Motivation


- Findings
  - Two groups with no piano playing experience
  - Taught 5-finger piano exercise
  - Group 1: Practiced on piano 2hr/day for 5 days
  - Group 2: Imagined and visualized practicing
  - Brains of both groups showed structural changes
  - Performance in both groups improved significantly
Play Propels Motivation


**Findings**
- Two groups of children brought into the lab for a problem solving task
- Group 1: Allowed unstructured free play with the objects beforehand and no instructions
- Group 2: Given instructions on how to use the objects
- Free play group able to solve complex problems more effectively
From the Lab:

Private Speech Propels Attention


- **Findings**
  - Seven- to 10-years olds asked to complete Tower of London task with a distracter
  - Group 1: Repeat the word “Monday”
  - Group 2: Tap feet
  - Children with disrupted private speech performed significantly more poorly
Movement

• Self-Regulation
• Aerobic Activity
• "Do the Information"

Wire together; fire together

From the Lab:

Gesture Propels Cognition


• Findings
  • Children asked to explain their solutions to difficult math problems
  • Group 1: Asked to gesture as they explained
  • Group 2: Asked to only verbally explain
  • Gesturing group more likely to add new, correct problem solving strategies to their repertoires
  • Gesturing group also more likely to attempt and succeed in difficult problems later

Collaboration

Learning and Solving Problems Together
From the Lab:

**Collaboration Propels Action**


- **Findings**
  - Children over-inflate their contribution to joint learning efforts
  - Those who over-estimated their contribution outperformed the others in future solo tasks

Onward From Here...

**More Conversation | More Access | More Integration**

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