CREATIVE THINKING

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PREMISE

By blending computational and creative thinking students can leverage their creative thinking skills to "unlock" their understanding of computational thinking

- ***Should be able to improve student learning and achievement in CS courses***
- ***Should be able to make computational thinking more generally applicable to STEM and non-STEM disciplines***

COMPUTATIONAL THINKING

A way of thinking for *logically* and *methodically* solving problems

- **E.g., *purposeful*, *describable*, *replicable***

Includes *skills* such as

- **Decomposition**
- **Pattern Recognition**
- **Abstraction**
- **Generalization**
- **Algorithm Design**
- **Evaluation**

CREATIVE THINKING

Epstein's Generativity Theory breaks creative thinking down to four core competencies

- ***Capturing*** **novelty**
- ***Challenging*** **established thinking and behavior patterns**
- ***Broadening*** **one's knowledge beyond one's discipline**
- ***Surrounding*** **oneself with new social and environmental stimuli**

BLENDING OF THE TWO …

BALANCING OF ATTRIBUTES	
Computational Thinking	**Creative Thinking**
Convergent thinking	Surrounding with new social and environmental stimuli
Linear and sequential “flow”	Challenging established solutions and algorithms
Rational & logical processes	Broadening possible solutions through additional paradigms
Methodical	Capturing novelty and spontaneous outputs

PRACTICE CREATIVE THINKING

It's mindset that's key, not prior knowledge or prior experience

- **Does not necessarily require prior domain knowledge**
- **And none require any self-identified "creativity"**
- **This is an immersive activity, which means**
  - You have to jump in
  - And leave your baggage behind

PRACTICE …

This baggage includes common creative blocks*

- **Not seeing the problem from multiple viewpoints**
- **stereotyping: finding/seeing what you expect; labeling**
- **Isolating the problem too much; imposing too many constraints**
- **Failure to use all sensory inputs**

These perceptual blocks keep us from perceiving the problem correctly or completely and conceiving a solution

*Adams, J. L. (2001). *Conceptual blockbusting: A guide to better ideas*. New York: Basic books.

PRACTICE … CHALLENGES

Can you …

- **Bring your experience but not your preconceptions?**
- **Have a sense of play and possibility?**
- **Risk not knowing or feeling foolish?**
- **Push beyond what you already know and do?**
- **Ask “what if” and dare to test it out?**