

Building Students' Cognitive Flexibility

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In today's world, the skillsets of cognitive flexibility are more critical and valuable than ever before. These skillsets include:

- Open-minded evaluation of different opinions, perspectives, and points of view
- Willingness to risk mistakes
- Consideration of multiple ways to solve problems
- Engagement in learning, discovery, and problem solving with innovative creativity

My previous posts in this series described strategies to build students' executive functions of organization, prioritizing, judgment, and critical analysis. In this post, I'll suggest ways to activate your students' developing neural networks of skillsets for **cognitive flexibility**. Students with these skillsets will be prepared to achieve their highest potentials for cognitive flexibility and the creative cognition to embrace the as-yet-unknown opportunities awaiting them in the 21st century.

Building the Skillsets for Cognitive Flexibility

Students need explicit instruction and opportunities to practice the flexible thinking that will make the most of their brains' fertile adolescent development stage. The unique anatomy and chemistry of this transitional state comprises increased dopamine receptors and accelerated neuroplasticity. This primes their brains with an accelerated drive for exploration, passion for things of high interest, and boosted willingness to exert effort and push envelopes when so inspired. The opportunities that you provide will give them greater access to develop these skillsets for expanded perspectives, wider outlooks, greater creativity, willing collaboration, and inspired innovation.

1. Resist Inattentional Blindness With Open-Minded Vision

How many times does the letter "o" appear in the following sentence?

The brain filters out objects that we've seen many times before when they are presumed not to be relevant to a current goal or task.

The correct answer is eight times. You may not have seen all eight because your attention filter doesn't always attend to data that's too familiar to stand out -- such as the "o" in **out**, **not**, **to**, and **or**.

Even more importantly, without looking back at the sentence, can you recall what it was about? Most people, especially products of educational experiences in the factory model style, cannot

describe the content of the sentence. This is the result of the inattentional blindness that restricts attention to the designated task so that one fails to notice other things in plain sight.

What we see depends on what we look for. Students need experiences to build that awareness and break the neural pattern established when their expectations are for a single "right" way to approach problems or interpret information. Create these experiences through the following strategies:

- **Fewer teacher-dispensed conclusions:** Open opportunities for inquiry, discovery, trial and error, collaborative groups, and other occasions for students to use the data, evaluate information, and then draw, compare, and revise their own conclusions.
- **Less restrictive language:** Avoid language that suggests a single correct answer or approach, such as, "What's *the* answer?"
- **More wait time:** When you ask a question, request that students not raise their hands until you provide time for everyone to consider (and ideally write down) his or her response. For many students, even seeing a classmate with hand up, ready to answer, blocks their brain from putting effort into considering their own response. The brain's greatest dopamine-reward pleasure comes from finding out if one's prediction or answer is correct. If students expect to hear their classmate's "correct" answer before they think of one, their brains won't make the mental effort because there's no expectation of the dopamine boost once the "answer" is given.
- **Broader questions:** Ask questions in class, in homework, and on assessments that look for more than a single solution and require students to provide alternative problem-solving approaches.

2. Divergent Thinking

The factory model of education promoted efficiency and favored uniformity. To prepare students for higher learning, global employment, and creative innovation, help them widen their perspectives with **divergent thinking** exercises and practices, such as:

- **"This is not. . ."** Play "This is not. . ." with students in a circle passing around a familiar object, such as a hand-held egg beater, and reporting in turn, "This is not an egg beater, it's a _____ (e.g. kite string rewriter, double-hole sand driller)."

- **Alternative representations for expanded perspective:**
 - Describe an event from a different point of view (e.g. a red blood cell traveling through its circulatory system roadways).
 - Retell a story or event from the point of view of another character (e.g. the whale in *Moby-Dick*, Paul Revere's horse, the color indigo in a rainbow).
 - Redraw a sketch by Picasso as an Impressionist artist such as Monet.

- **Variety of perspectives:** Examine different sides of the same story by comparing multiple media accounts, primary sources, biographies about a person, or representations of a current or historical event.
 - Recognize the variety of perspectives by viewing images of Pocahontas from the Disney film, portraits painted in England, and book or article descriptions about what she reportedly looked like.
 - Create variations of historical outcomes (e.g. what you would have done differently than Winston Churchill regarding the participation of Great Britain in WWII).
 - What might life be like without the internet?

3. Transfer Opportunities

Creativity takes place when new neural linkages form between previously unconnected networks of stored knowledge. When you provide learners with opportunities to transfer their learning to novel applications, you're extending their cross-brain connections and creative potentials.

- Once students have learned the appropriate unit in biology, ask them to describe what interventions from modern times they would take back to the 15th century to reduce the ravages of the Black Plague.
- Collage art inspires cognitive flexibility because components are decoupled from their literal roles and used in novel ways.
- As you learn about the nutritional food pyramid, create an ideal school lunch menu that maximizes your favorite foods and fulfills the nutritional requirements.

Teachers as Caretakers of Student Brainpower

As you guide students to activate and strengthen their growing neural networks of executive functions, you'll see their progress in self-management, organizing, making thoughtful decisions, planning for goals, media literacy, flexible thinking, and creative innovation. Embedding these skills will establish their most valuable sources of wisdom for successful, joyful engagement with the 21st century's challenges and opportunities.

H.G. Wells predicted that our future would be a race between education and catastrophe. We live in very exciting times. As educators, we can unleash our creativity, with the help of neuroscience, to boost our students' developing executive functions. Through these fortified skillsets, including the cognitive flexibility skills needed for global collaboration, they'll do more than just win the race -- they will push the boundaries beyond the finish line.