Emotions Help Steer Students' Learning, Studies Find

Scholar sees passion as mind's 'rudder'

By Sarah D. Sparks

Despite what Star Trek's Mr. Spock would have you think, emotions are not the enemy of reason. Rather, new research suggests emotions underpin how students learn in the classroom.

"People think of emotion getting in the way of cognition, but it doesn't. Emotion steers our thinking; it's the rudder that directs our mind and organizes what we need to do," said Mary Helen Immordino-Yang, an associate professor of education, psychology, and neuroscience at the University of Southern California, in an interview with Education Week.

In a new book, Emotions, Learning, and the Brain, Immordino-Yang and her colleagues at USC's Brain Creativity Institute found that as students learn new rules during a task, such as the most efficient way to answer a math problem or the best deck to choose in a card game, they show emotional and physical responses long before they became consciously aware of the rules or are able to articulate them.

Gut Check

This emotional response—think of a student having a "gut feeling" that a particular answer was right—was the first sign of a student learning from her experience with the task. In fact, separate studies found that people with a particular type of brain damage—to a part of the brain that connects areas associated with feeling emotions with those associated with developing cognitive strategies—do not learn from failure and continue to choose inappropriate strategies for solving a problem even if they consciously "know" the rules.

"What happens when thinking is devoid of emotion is you don't remember it or think deeply about it," Immordino-Yang said.

In a classroom context, Immordino-Yang said, that means students who feel no meaningful emotional connection to the material they learn will have a harder time both remembering and applying it.

While educators have long discussed the role of music...
or art in engaging students emotionally with learning, Immordino-Yang and her colleagues have found that even abstract academic concepts can inspire an emotional connection if people understand their context. For example, mathematicians show the same pleasure response in the brain when they see an efficient equation as others have shown when viewing a beautiful piece of art.

"The ability to feel passionate about something is a skill. What we need to teach kids is that feeling passionate about something doesn't just fall into your lap," said Immordino-Yang. Rather, students can learn how to take interest in subjects that aren't immediately entertaining.

By the same token, separate studies help endorse Mr. Spock's point of view: They suggest that negative emotions can interfere with learning in part because they compete with normal engagement with new concepts.

**Feedback Cycles**

As important as emotion seems to be for learning, schools may not do enough to support students' emotional development as a tool for learning, some experts argue. Prior studies have shown children become less positive over the course of elementary school, and new German studies suggest academic engagement and achievement—or the lack of them—could create feedback loops for young students.

Stephanie Lichtenfeld, a senior psychology lecturer at the University of Munich, tracked 520 students in 31 schools from the beginning of 2nd grade through the end of 4th grade. She recorded the students' levels of enjoyment, anxiety, and boredom in math classes, as well as their end-of-year math-achievement levels.

"The emotional pattern gets increasingly negative over the school years," Lichtenfeld said. "Enjoyment really drops over elementary school years, and negative emotions like test anxiety and boredom increase."

Why? Lichtenfeld found each of the emotions created a feedback loop with academic achievement. A student who was anxious in math class in 2nd grade was likelier to have lower math achievement at the end of the year; lower math achievement at the end of 2nd grade made it likelier that the student would be even more anxious in 3rd grade, increasing the risk of even lower math performance, and so on through elementary school. Boredom also produced a negative cycle, while early enjoyment in math created a positive feedback cycle.

"These built on themselves over time," Lichtenfeld said during a symposium on emotion at the American Educational Research Association meeting in Washington this month. "That's really a pattern where we should think about interventions to make students feel better in school" in the early grades as a way to improve performance.

Moreover, in a separate German study also presented at the meeting, Philipp Forster of the Ludwig Maximillian University in Munich, found negative emotions can spread among classmates in school.
Forster and his colleagues tracked 411 students in 16 high school math classes in Bavaria. Through surveys, the researcher identified which students were friends and also profiled each student's levels of school engagement, motivation, achievement, and disruptive behavior.

While students did not initially select friends with the same personality profiles, Forster found that students' negative emotions—anger, anxiety, and hopelessness—became more similar to those of their friends over time. By contrast, students did not seem to become more like their friends in positive emotions like enjoyment or pride.

Immordino-Yang recommended four strategies for teachers to improve students' emotional basis for learning:

• Give students open-ended problems that force them to dig into the definition of the task itself.

• Encourage students to recognize and use their own academic "intuitions" while learning—for example, to notice when they feel uneasy about an answer and look back later to see if it was incorrect.

• When trying to improve students' emotions in the classroom, focus on adding meaning to content the students are working with, rather than positive distractions, like telling a joke or giving prizes.

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