Glossary

The definitions in this glossary are offered in everyday language as much as possible to help deepen your understanding of key concepts in neuroscience and culturally responsive teaching.

Affirmation. The practice of intentionally noticing and admiring the uniqueness of culturally and linguistically diverse students. It includes seeing as positive those elements that the dominant culture tries to portray as unattractive or undesirable, such as their hair, skin color, verbal agility, or energetic style.

Alliance. It is the second part of the learning partnership equation. Alliance focuses on helping the dependent learner begin and stay on the arduous path toward independent learning. An alliance is more than a friendship. It is a relationship of mutual support as partners navigate through challenging situations.

Amygdala hijack. The process when the amygdala is in an active state of stress, fear, or anxiety. It signals the body to release the stress hormone, cortisol. The cortisol blocks rational thinking and temporarily reduces the capacity of the working memory making learning difficult.

Autonomic nervous system. This is the portion of the nervous system comprised of the spinal cord and brain. It includes the sympathetic nervous system, parasympathetic nervous system, and polyvagal nervous system.

Cognitive insight. It is the third part of the learning partnership. It is the teacher's ability to understand a student's internal learning process. Formative assessments and instructional conversation are key tools for gaining insight into a student's learning moves.

Cortisol. Cortisol is the primary stress hormone. Chronic exposure to cortisol because of stress reduces working memory and suppresses the body's immune system.

Cultural archetype. It is a similar set of beliefs, values, or behaviors that show up in different cultures.

Culturally responsive teaching. The process of using familiar cultural information and processes to scaffold learning. Emphasizes communal orientation. Focused on relationships, cognitive scaffolding, and critical social awareness.

Dendrites. Treelike extensions at the beginning of a neuron that help increase its surface area. These tiny tentacles receive information from other neurons and transmit electrical stimulation. Dendrites grow in response to learning, especially a challenging task. The more dendrites the neuron generates the more brainpower it creates.

Dopamine. A chemical in the brain associated with attention and reward-stimulated learning. Our brains release dopamine when we are playing, laughing, exercising, and receiving acknowledgment (e.g., praise) for achievement.

Fixed mindset. Fixed mindset students believe their basic abilities, their intelligence, and their talents are just fixed traits. For high achievers, their goal becomes to look smart all the time and never risk looking dumb. For low achievers, their goal is to avoid challenging work so as not to confirm their low intelligence.

Formative assessments. Also called assessment *for* learning. It is the process of using simple tools to determine how well content has been learned so that the learner can make adjustments to his learning moves in the moment.

Learning partnership. A learning partnership is a teacher-student relationship in which the teacher builds trust and becomes the student's ally in order to help the student reach a higher level of achievement.

Gray matter. Gray matter refers to the brownish-gray color of the nerve cell bodies (neurons). The wrinkled appearance of the brain results from the overgrowth of gray matter in the small skull cavity.

Growth mindset. In a growth mindset, students understand that their talents and abilities can be developed through effort, active learning, and persistence.

Implicit bias. Refers to the unconscious attitudes and stereotypes that shape our responses to certain groups especially around race, class, and language. Implicit bias operates involuntarily, often without one's awareness or intentional control. Implicit bias is not implicit racism.

Information processing. The brain's process of turning inert facts and content into useable knowledge. Includes three stages: input, elaboration, and application. Active information processing stimulates brain growth.

Instructional conversation. Classroom discourse that is focused on having students talk about their learning process and learning moves. It is an extension of information processing and feedback.

Intellective capacity. Refers to a student's malleable information processing power. Also called fluid intelligence or intellectual competence. Intellective capacity grows through neuroplasticity.

Internalized oppression. When people are targeted, discriminated against, or oppressed over a period of time, they often internalize (believe and make part of their internal view of themselves) the myths and misinformation that society holds about their group.

Learned helplessness. The victim mentality a learner adopts when repeatedly subjected to negative stimulus. Over time the learner stops trying to avoid the stimulus and believes he is helpless to change the situation. Includes a lack of confidence in one's ability and a belief that effort is useless.

Limbic region. The limbic is the second brain layer. Also called the mammalian brain. It is involved in regulation of emotion, memory, and processing complex socioemotional communication. The amygdala is located here.

Long-term memory. Long-term memory is created when short-term memory is strengthened through review and meaningful association with existing funds of knowledge. This strengthening results in a physical change in the structure of neuronal circuits, creating more gray matter in the brain.

Mental model. A mental model is an explanation of someone's thought process about how something works in the real world. It is one's internal representation of the surrounding world. Mental models shape our behavior, decision making, and relating to others. See also Schema.

Microaggressions. They are small, subtle verbal insults or nonverbal actions directed at people of color that intentionally or unintentionally communicate mistrust or hostility, such as clutching one's purse if a person of color gets into an elevator or when store personnel follow a person of color around a store while he is shopping.

Mindset. A set of mental attitudes that determines how one will interpret and respond to situations. See also Fixed mindset and Growth mindset.

Myelin. The fatty substance that covers and protects nerves. Myelin acts like a conductor in an electrical system, ensuring that messages sent along the neuron are not lost as they travel to the next neuron. Myelin enhances the function of neurons and dendrites.

Myelination. The formation of the myelin sheath around the body of a neuron to increase the speed of electrical impulses containing information.

Negativity Bias. The brain's innate tendency to pay more attention to and overreact to negative events, information, and experiences. Believed to be part of the stereotyping feature of our safety-threat system charged with keeping us safe.

Neuroception. Describes the process our brain uses to distinguish whether situations or people are safe, dangerous, or life threatening. The autonomic nervous system, particularly the polyvagal nerve, is responsible for controlling neuroception. See also Safety-threat detection system.

Neurons. Specialized cells in the brain and throughout the nervous system that control storage and processing of information to, from, and within the brain, spinal cord, and nerves. Neurons are composed of a main cell body, a single major axon for outgoing electrical signals, and a varying number of dendrites to pass along coded information throughout the nervous system.

Neuroplasticity. Refers to the capacity of the brain to change its structure and reorganize itself in response to injury, experience, or challenge. Associated with expanded learning capacity.

Oxytocin. Oxytocin is a neurotransmitter that stimulates our sense of connection with others. It is called the bonding hormone.

Neocortex region. It is the newest layer of the brain. Also called the prefrontal cortex (PFC). It is the hub of neural networks that directs intake and output to almost all other regions of the brain. Through executive functions in the PFC, the brain moves information to the working memory to be mentally manipulated so it becomes long-term knowledge. This area of the brain also controls conscious decision making, organizing, analyzing, self-monitoring, self-correcting, reflection, and problem solving.

Productive struggle. When the learner has developed the necessary strategies for working through something difficult. The mental activity that takes place when students are in their zone of proximal development.

Rapport. A close and harmonious relationship between people characterized by a sense of connection, personal regard, and trust.

Relaxed alertness. It is the optimum learning state of the brain. The brain experiences low threat while it is alert and paying attention with anticipation. The term can also apply to the emotional tone of the classroom that creates a social and intellectually safe environment.

Reticular activating system (RAS). Located in the reptilian region of the brain, it is the portal through which nearly all information enters the brain. (Smells are the exception; they go directly into your brain's emotional area). It filters all incoming stimuli and decides what to pay attention to and what to ignore. Novelty, curiosity, changes in the environment, surprise, danger, and movement all capture the attention of the RAS. It sends signals to the amygdala when it detects a social or physical threat.

Safety-threat detection system. Our brain's system to help carry out its prime directive: minimize threats and maximize well-being. See also Neuroception.

Schema. A schema is a cognitive framework or concept that helps organize and interpret information. Schemas can be useful because they allow us to take shortcuts in interpreting the vast amount of information that is available in our environment. However, these mental frameworks also cause us to exclude pertinent information to instead focus only on things that confirm our preexisting beliefs and ideas.

Self-efficacy. One's internal belief and self-confidence that one has the power and skills to shape the direction of one's learning experience.

Short-term memory. This stage of memory holds and manipulates information for use only in the immediate future, for approximately one minute, until the RAS decides to let it into the working memory.

Sociopolitical context. A term used to describe the series of mutually reinforcing policies and practices across social, economic, and political domains that contribute to disparities and unequal opportunities for people of color in housing, transportation, education, and health care, to name a few. These unequal opportunities result in unequal outcomes along racial and class lines.

Stereotype threat. Refers to a students' fear of confirming a negative stereotype about his racial, ethnic, socioeconomic group (i.e., African Americans aren't smart) by his actions (such as failing a test). This anxiety triggers an amygdala hijack, releasing stress hormones and shutting down all learning, making it more likely that he will fail.

Structural racialization. Refers to the ways in which supposedly race neutral policies and practices across social, political, and economic institutions create racialized outcomes. See also sociopolitical context.

Validation. Refers to the explicit recognition and acknowledgement of historical institutional racism, negative stereotyping, and generalizations that impact culturally and linguistically diverse students.

Warm Demander. A teacher who communicates personal warmth toward students while at the same time demands they work toward high standards. Provides concrete guidance and support for meeting the standards, particularly corrective feedback, opportunities for information processing, and culturally-relevant meaning making.

Wise feedback. Wise feedback is a way of giving feedback that reassures the student that he is not viewed in light of a negative stereotype. We assume rather than doubt his intellectual abilities. Wise feedback conveys faith in the potential of the student while being honest about where he is right now.

Working memory. The working memory is the area in the brain where new information is coupled with existing knowledge. The elaboration stage of information processing takes place mainly in the working memory.

Zone of proximal development. The difference between what a learner can do without help and what he can do with help. Because learning in the zone of proximal development is a stretch for a student, the brain responds by growing more neurons and dendrites. Also called the ZPD.