TUTORING WITH THE BRAIN-BASED NATURAL HUMAN LEARNING PROCESS

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NATURAL LEARNING PROCESS: CLASSROOM/FIELD RESEARCH

- Over 7,000 people—from 2nd graders to graduate students to educators—have reported how they learned to be good at something outside school.
- Every group, without exception, has reported the same sequence of stages by which they learned.

THE NATURAL LEARNING STAGES

(COMPRESSED IN 4 STAGES OR EXPANDED IN 6 STAGES)

STAGE 1: *Motivation*/watch, have to, shown, interest

STAGE 2: *Start to Practice*/practice, trial & error, ask ?'s

STAGE 3: *Advanced Practice*/practice, lessons, read, confidence

STAGE 4: *Skillfulness*/some success, enjoyment, sharing

STAGE 5: *Refinement*/improvement, natural, pleasure, creative

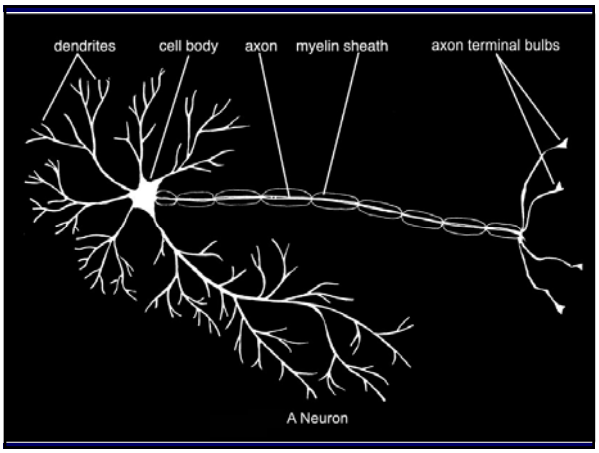
STAGE 6: *Mastery*/teach, recognition, higher challenges

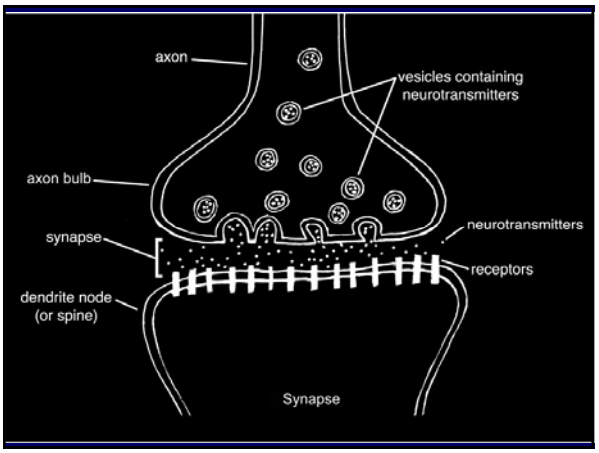
THE NATURAL LEARNING PROCESS

We learn through those stages because this is how the brain learns-- by constructing knowledge through sequential stages.

HOW THE BRAIN LEARNS

- We have about 100 billion brain nerve cells (neurons).
- Each neuron has one axon with many tails (terminals). These axon terminals send electrochemical messages to other neurons across tiny spaces called synapses.
- Learning creates the synaptic connections. The result is knowledge and skill constructed in our brain.





EMOTIONS AFFECT LEARNING

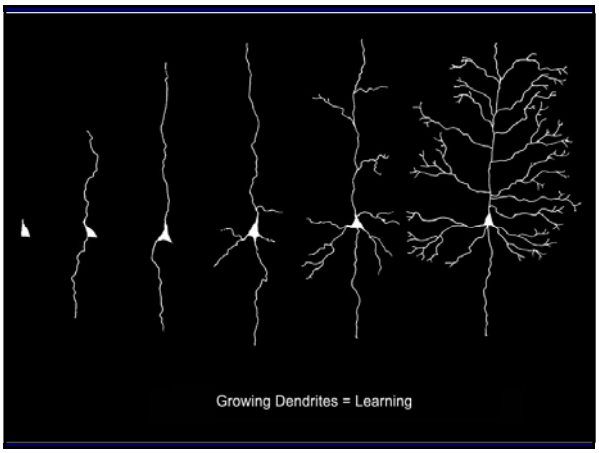
- When learners feel unconfident or anxious, certain chemicals flow into the synapses to shut them down: "Danger! No time to think! Just run away!" This is the flight reaction. Students mistakenly think they have a poor memory, but it is their emotions that are sabotaging them.
- When learners feel confident, different chemicals flow into the synapses that make them work quickly and well: "I can handle this." This is the fight reaction

HOW THE BRAIN LEARNS

- Each neuron has thousands of dendrites (like tree branches and twigs--"dendrite" means "tree-like") which receive chemical-electrical messages from other neurons' axons across the synapses.
- Specific neural networks, which might include as many as 10,000 neurons, are what we know and can do.

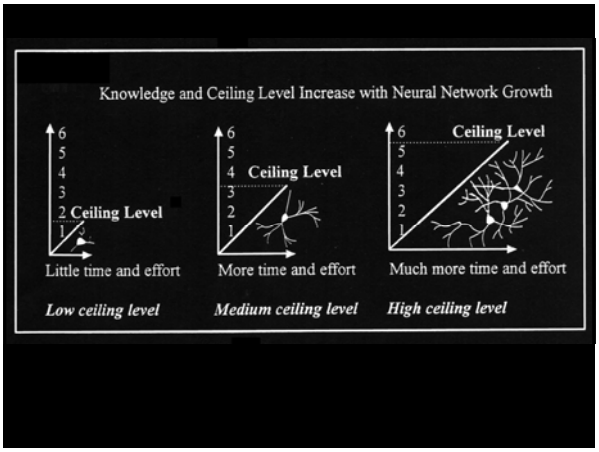
THE BRAIN'S CONSTRUCTIVE LEARNING PROCESS

- Like twigs on a tree that can grow only from a twig or branch that is already there, so dendrites can grow only from a dendrite that is already there--from something the learner already knows.
- Then, like twigs growing on a tree, learning is constructed, higher and higher, skill and understanding increasing.



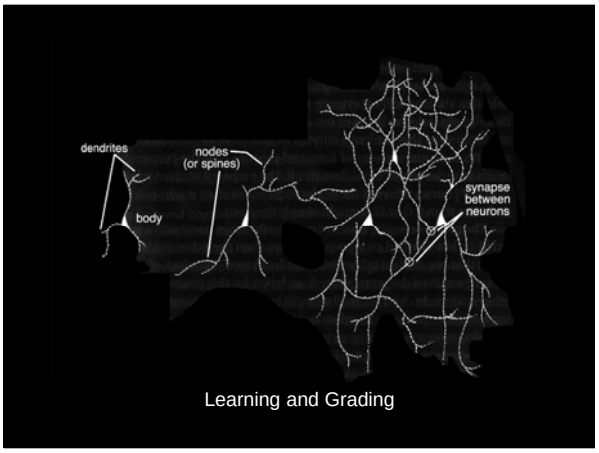
THE BRAIN'S CONSTRUCTIVE LEARNING PROCESS

- As we learn (as we experience, practice, process), specific dendrites grow so that specific neurons connect at specific synapses to create larger and more-complex specific neural networks.
- These networks are what we know.
- *The more we grow, the more we know, i.e., our ceiling level rises.*



IMPLICATIONS

- Students who have had the opportunity to construct a foundation of the specific prerequisite dendrites for a specific skill or subject—or for school learning in general—will be able to catch on in class. They will be the A or B students.
- Students without this opportunity, even though capable and intelligent, won't be able to catch on as easily and quickly. They will be the F, D, or C students.

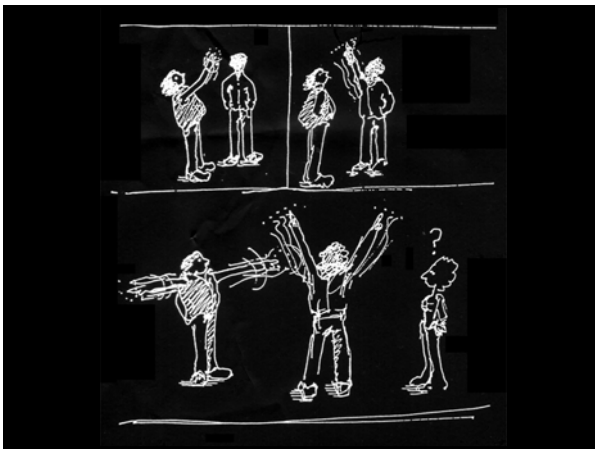


IMPLICATIONS

- If students haven't had the opportunity to grow the foundation dendrites for a new topic or skill, they don't have the basis from which to grow—on which to connect and construct—the dendrites for the higher levels of skill and knowledge.
- Should we judge them as incapable or of less intelligence or talent and throw them and their potential away because they never had that opportunity?

IMPLICATIONS

- Students from different cultures have different experiences and learn different things, grow different neural networks.
- However, we all learn by the same brain-based natural-learning process.
- When both tutors and tutees have this metacognitive knowledge—of their different neural networks (knowledge) and, yet, their similar natural learning process—they are able to work together more successfully.



ESSENTIAL TRUTHS ABOUT LEARNING AND TEACHING

- The brain starts all learning from where it is and constructs the new from there.
- The seven magic words that are the mating call of the brain are, "See if you can figure this out."
- When these magic words are implicit or explicit in any lesson, the brain says, "I want to do that!" and the learner is motivated, engaged, and empowered.

STUDENTS AS EMPOWERED, ENGAGED, SUCCESSFUL LEARNERS

- Learning is all about empowerment.
- The brain is our survival organ. It is born to learn, is impelled to learn.
- The brain produces endorphins, the pleasure hormone, when it is learning.
- What if we had a way to help tutees, in any subject, be the motivated, engaged, natural learners they are born to be?

THE BRAIN'S CONSTRUCTIVE LEARNING PROCESS

- As a learner goes through the stages of this natural learning process, the learner's brain constructs its neural networks from the lowest twig up.
- Thus, the first lesson must help a tutee make a connection to a twig already there, to something already known.

THE BRAIN'S CONSTRUCTIVE LEARNING PROCESS

- For example, to find out what a tutee already knows about the skill or concept, ask, "What do you know about . . . .?"
  Or give the tutee a problem to solve or a task to do that requires some knowledge of the skill or concept.
- Then you will know what the tutee knows and doesn't know and you will know where to start—sometimes higher or lower than the tutee or instructor thought.

USING THE NATURAL LEARNING PROCESS FOR ACTIVE, STUDENT-CENTERED LEARNING

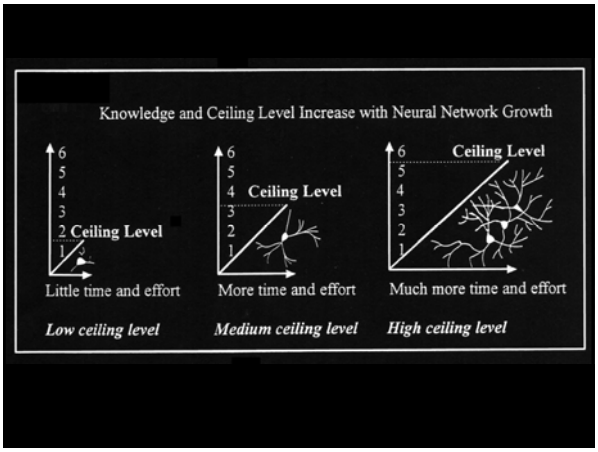
- For initial (maybe all) lessons, tutees should first be invited to do their own thinking and doing and then share and discuss what they thought or did with the tutor.
- The tutor can now see what might be missing. When a prerequisite, preliminary foundation of dendrites is missing, the tutee needs to grow that foundation in order to be able to move up to understand the higher level of skill and knowledge.

USING THE NATURAL LEARNING PROCESS FOR ACTIVE, STUDENT-CENTERED LEARNING

- After this, the tutor might want to add something—and the students will be eager to hear and discuss it.

STUDENTS AS EMPOWERED, ENGAGED, SUCCESSFUL LEARNERS

- When students self-evaluate how much their dendrites have grown, they see that they are in control of their learning.
- They know their learning, their ceiling level, their neural network, increases as they put in more time and effort.



ESSENTIAL TRUTHS ABOUT LEARNING AND TEACHING

- When learners have all this invaluable metacognitive knowledge, they are empowered to be self-responsible and to have self-efficacy.
- When tutors have this knowledge, they can better help their tutees become the natural, motivated, successful learners they are born to be.

FACES

Behind every face is a brain that puts the look in the eye, the expression on the face, the words that come out of the mouth—and has these innate needs:

Figure it out (Fairness/Justice)
Acceptance (Affirmation/Respect)
Community (Connections/Constructivism)
Empowerment (Engagement)
Safety