




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.

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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

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THE NATURAL LEARNING PROCESS

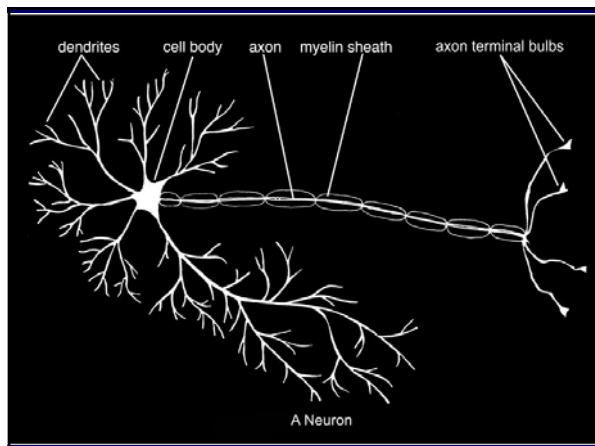
We learn through those stages because this is how the brain learns-- by constructing knowledge through sequential stages.

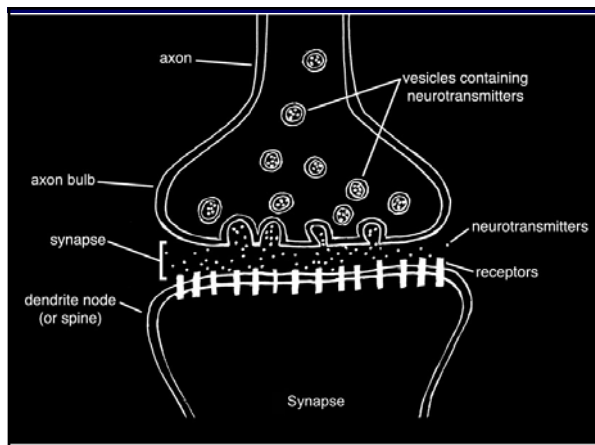
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HOW THE BRAIN LEARNS

- 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.

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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

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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.

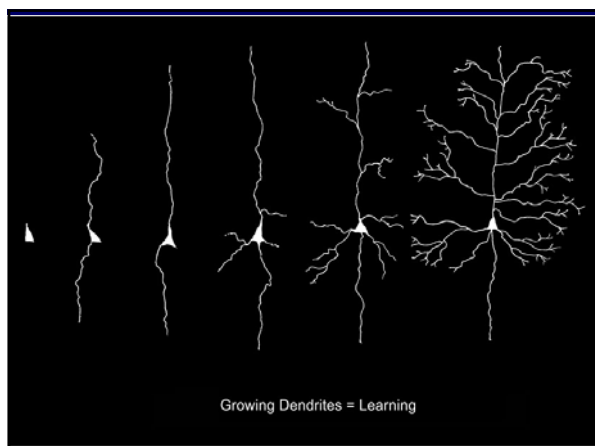
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THE BRAIN'S CONSTRUCTIVE LEARNING PROCESS

- 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.

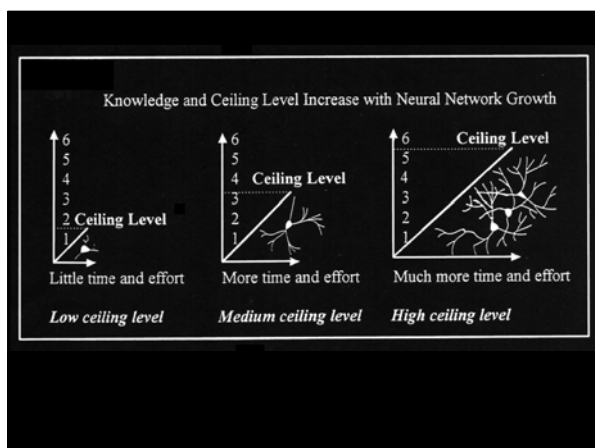
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THE BRAIN'S CONSTRUCTIVE LEARNING PROCESS

- 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.*

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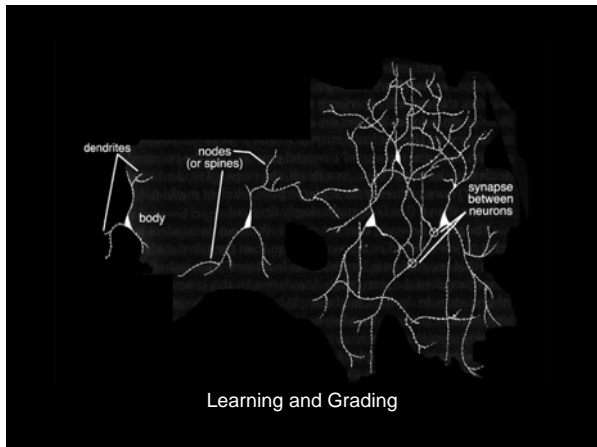


IMPLICATIONS

- 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.

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- [illegible]



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?

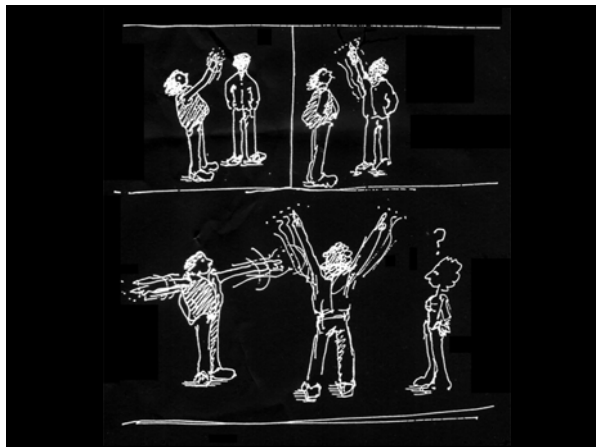
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IMPLICATIONS

- 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.

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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.

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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?

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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.

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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.

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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.

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

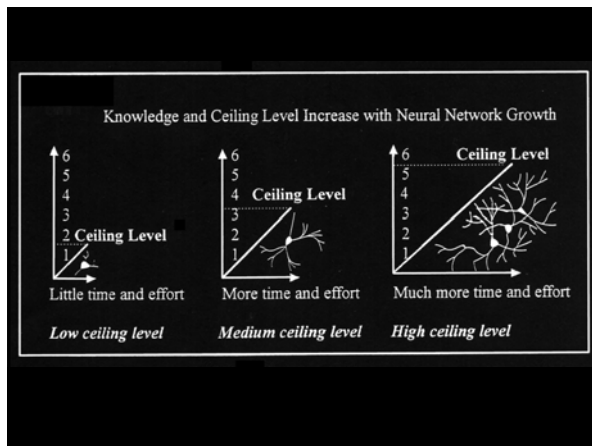
- After this, the tutor might want to add something—and the students will be eager to hear and discuss it.

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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.

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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.

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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)
- Empowermen (Engagement)
- Safety

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