

22nd April 2021

Learning to Learn

The Need, Tips and Theory

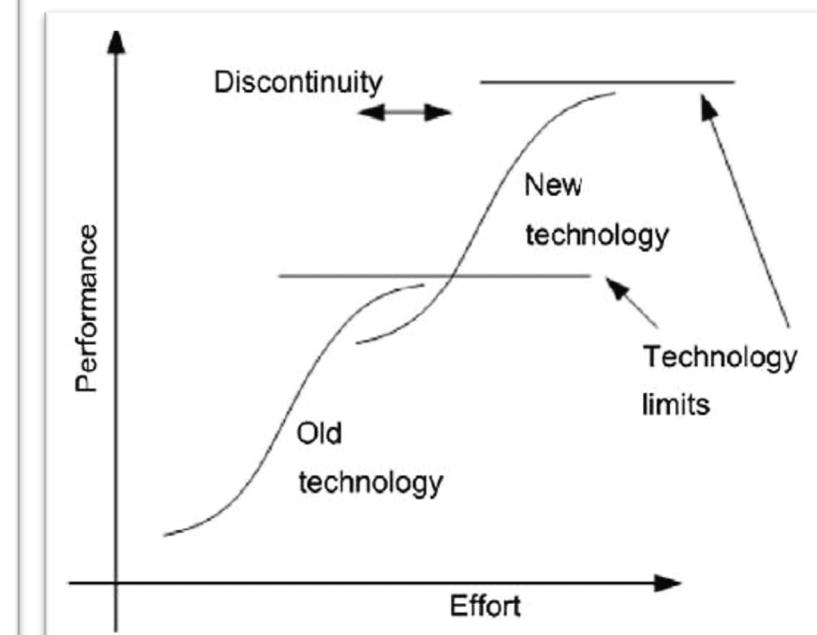
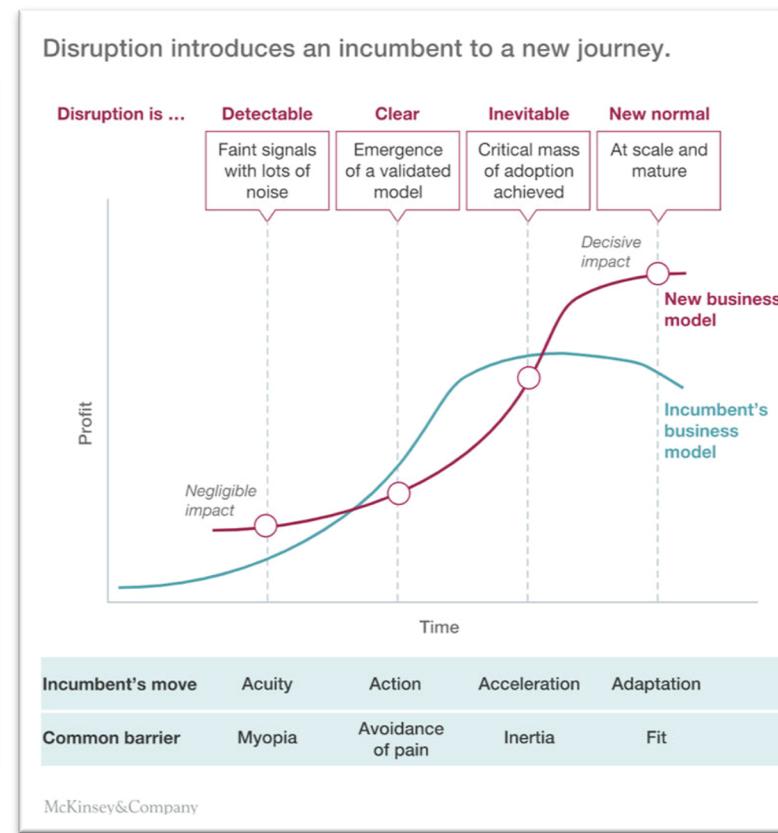
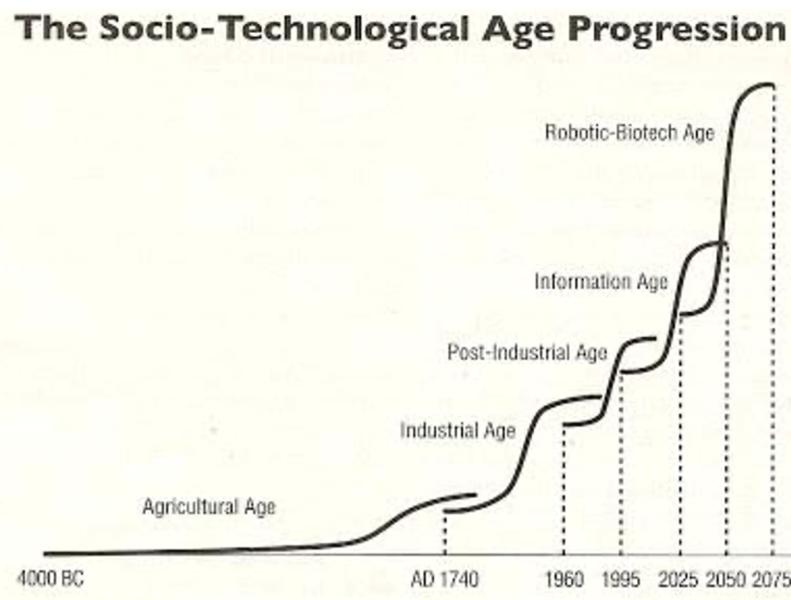
By

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The Need - Why should you learn?



You want to learn so that you can pivot your career with new learnings !

Whenever at different points of your careers, you hit glass ceilings in growth (be it vertical/horizontal/compensation), here are a few ways how learning can help !

- Look for new emerging technology S curves and try to climb them.
- Requires a lot of learning & hard work to be hands-on in the new area though.
- Gain experience by being part of an open-source project or creating your own open-source initiative.
- Beware that some S curves plummet without ever reaching maturity and some take longer periods of maturity.
- Developing passion for an area of learning is important though, and career switching as a motivation won't cut ice, because you will get frustrated quickly, with steep climbs along the learning curves.
- This also works for Freshers or people with career breaks, as no one will ever ask you, whether you have significant years of experience in a fresh new technology :-)

My personal learning tips !

- Subscribe to as many knowledge sources as possible
 - [Orielly online](#)
 - [ACM](#)
 - [Coursera](#)
- Make spending time in bookshops as favorite hobby
- Buy lot more books than can you read (every month)
- Pick books from areas & domains that you have no clue or interest !

RESEARCH AND THEORY REVIEW ON LEARNING



What we know about learning

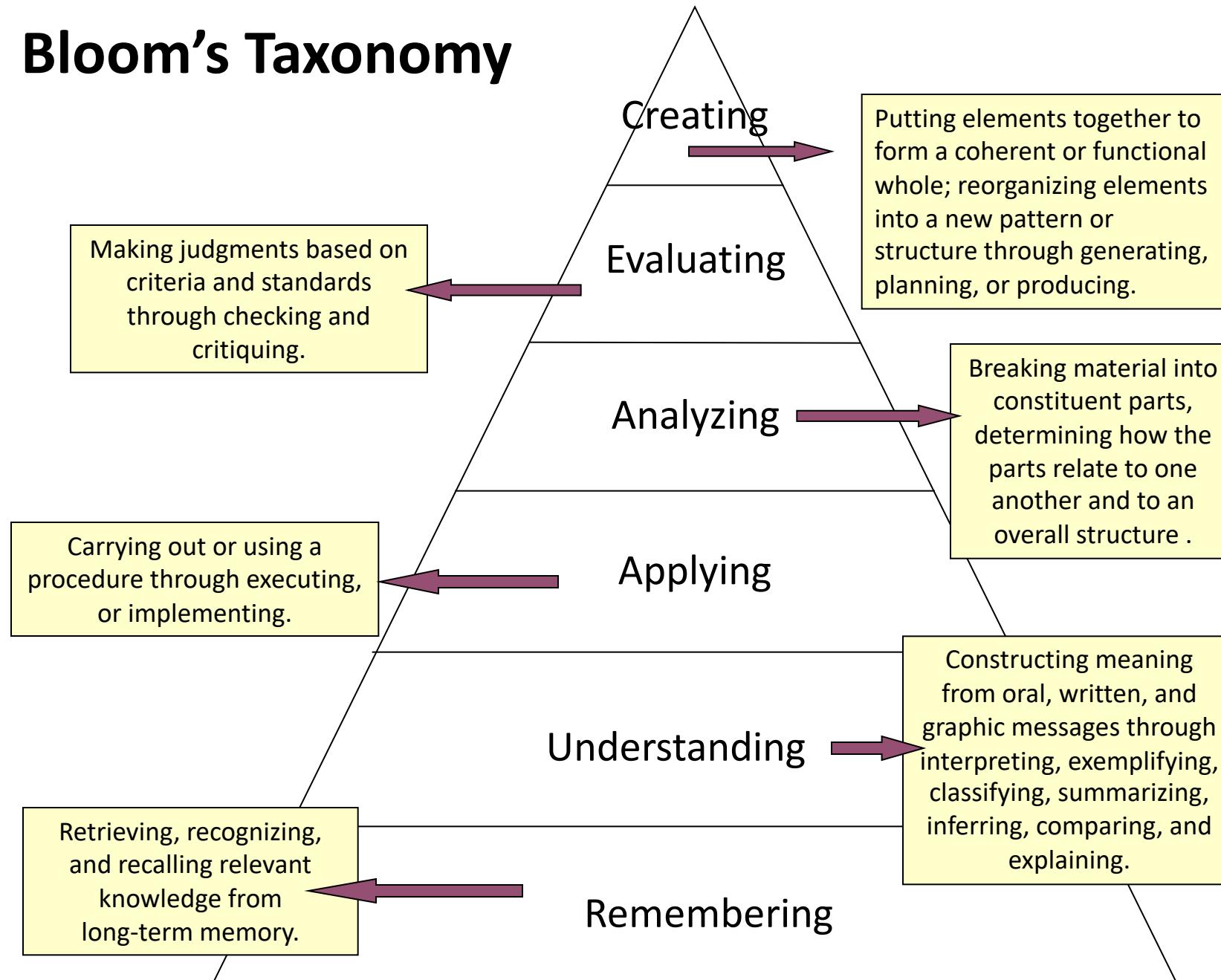
- Active learning is more lasting than passive learning
 - Passive learning is an oxymoron*
- Thinking about thinking is important
 - Metacognition**
- The level at which learning occurs is important
 - Bloom's Taxonomy***

*Cross, Patricia, "Opening Windows on Learning" League for Innovation in the Community College, June 1998, p. 21.

** Flavell, John, "Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry." *American Psychologist*, Vol 34(10), Oct 1979, 906-911.

*** Bloom Benjamin. S. (1956). *Taxonomy of Educational Objectives, Handbook I: The Cognitive Domain*. New York: David McKay Co Inc.

Bloom's Taxonomy



This pyramid depicts the different levels of thinking we use when learning. Notice how each level builds on the foundation that precedes it. It is required that we learn the lower levels before we can effectively use the skills above.

Learning Styles

- Visual
- Auditory
- Kinesthetic
- Reading/Writing
- Assessments for Identifying Learning Styles:
<http://www.educationplanner.org/students/self-assessments/learning-styles-quiz.shtml>

Visual Learner

- **How to recognize visual learners in your class:**

- Someone with a preference for visual learning is partial to seeing and observing things, including pictures, diagrams, written directions and more.
- This is also referred to as the “spatial” learning style. Students who learn through sight understand information better when it’s presented in a visual way.
- These are your doodling students, your list makers and your students who take notes.

- **How to cater to visual learners:**

- The whiteboard or smartboard is your best friend when teaching these types of learners. Use share screen often and interactive board in virtual platform.
- Give students opportunities to draw pictures and diagrams on the board or ask students to doodle examples based on the topic they’re learning.
- Teachers catering to visual learners should regularly make handouts and use presentations.
- Visual learners may also need more time to process material, as they observe the visual cues before them. So be sure to give students a little time and space to absorb the information.

Auditory Learner

- **How to recognize auditory learners in your class:**

- Auditory learners tend to learn better when the subject matter is reinforced by sound.
- These students would much rather listen to a lecture than read written notes, and they often use their own voices to reinforce new concepts and ideas.
- These types of learners prefer reading out loud to themselves.
- They aren't afraid to speak up in class and are great at verbally explaining things.
- Additionally, they may be slower at reading and may often repeat things a teacher tells them.

- **How to cater to auditory learners:**

- Since these students generally find it hard to stay quiet for long periods of time, get your auditory learners involved in the lecture by asking them to repeat new concepts back to you.
- Ask questions and let them answer.
- Invoke group discussions so your auditory and verbal processors can properly take in and understand the information they're being presented with. Use Breakout sessions for this.
- Record your Lecture and allow for them to review later.
- Watching videos and using music or audiotapes are also helpful ways of learning for this group.

Kinesthetic Learner

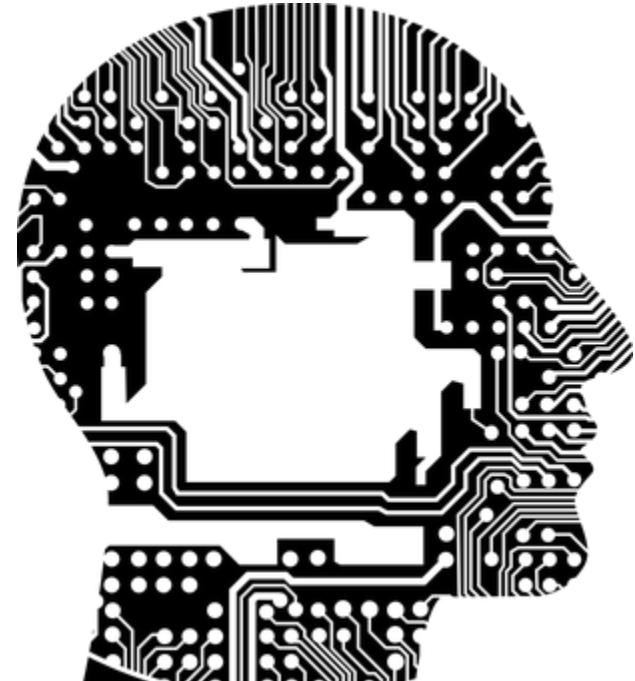
- **How to recognize kinesthetic learners in your class:**
 - Kinesthetic learners, sometimes called tactile learners, learn through experiencing or doing things.
 - They like to get involved by acting out events or using their hands to touch and handle in order to understand concepts.
 - These types of learners might struggle to sit still and often excel at sports or like to dance.
 - They may need to take more frequent breaks when studying.
- **How to cater to kinesthetic learners:**
 - The best way teachers can help these students learn is by getting them moving.
 - Instruct students to act out a certain scene from a book or a lesson you're teaching.
 - Also try encouraging these students by incorporating movement into lessons: pacing to help memorize, learning games that involve moving around the classroom or having students write on the whiteboard as part of an activity.
 - Incremental movement breaks will be needed.
 - Breakout groups and small class activities that engage them in movement activities.
- Once kinesthetic learners can physically sense what they're studying, abstract ideas and difficult concepts become easier to understand.

Reading/ Writing Learner

- **How to recognize reading/writing learners in your class:**
 - Reading/writing learners prefer to learn through written words.
 - While there is some overlap with visual learning, these types of learners are drawn to expression through writing, reading articles or books, writing in diaries, looking up words in the dictionary and searching the internet for just about everything.
- **How to cater to reading/writing learners:**
 - Of the four learning styles, this is probably the easiest to cater to since much of the traditional educational system tends to center on writing essays, doing research and reading books.
 - Be mindful about allowing plenty of time for these students to absorb information through the written word and give them opportunities to get their ideas out on paper as well.

Metacognitive skills

- The importance of metacognition in the process of learning is an old idea that can be traced from Socrates' questioning methods to Dewey's twentieth-century stance that we learn more from reflecting on our experiences than from the actual experiences themselves (Dewey, 1933)
- Metacognition refers to one's knowledge concerning one's own cognitive processes or anything related to them (Flavell, 1979).
- Metacognition also includes self-regulation—the ability to orchestrate one's learning: to plan, monitor success, and correct errors when appropriate as well as the ability to reflect on one's own performance (Finnish core curriculum)

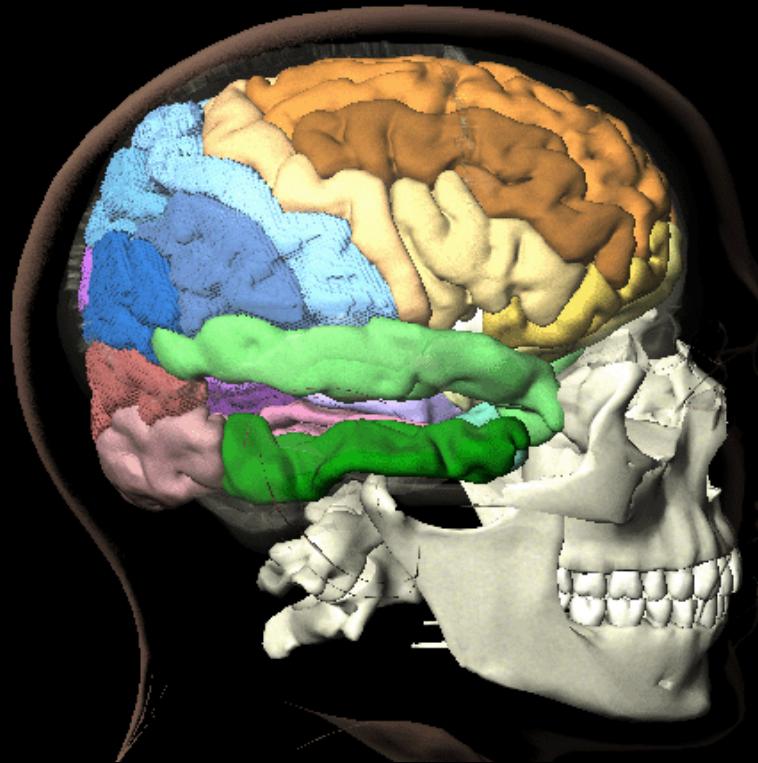


RESEARCH AND THEORY REVIEW ON LEARNING - BRAIN SCIENCE

Source:

*Kenneth Wesson
Educational Consultant: Neuroscience
San Jose, CA
kenawesson@aol.com*

“How does the human brain learn?”



*Kenneth Wesson
Educational Consultant: Neuroscience
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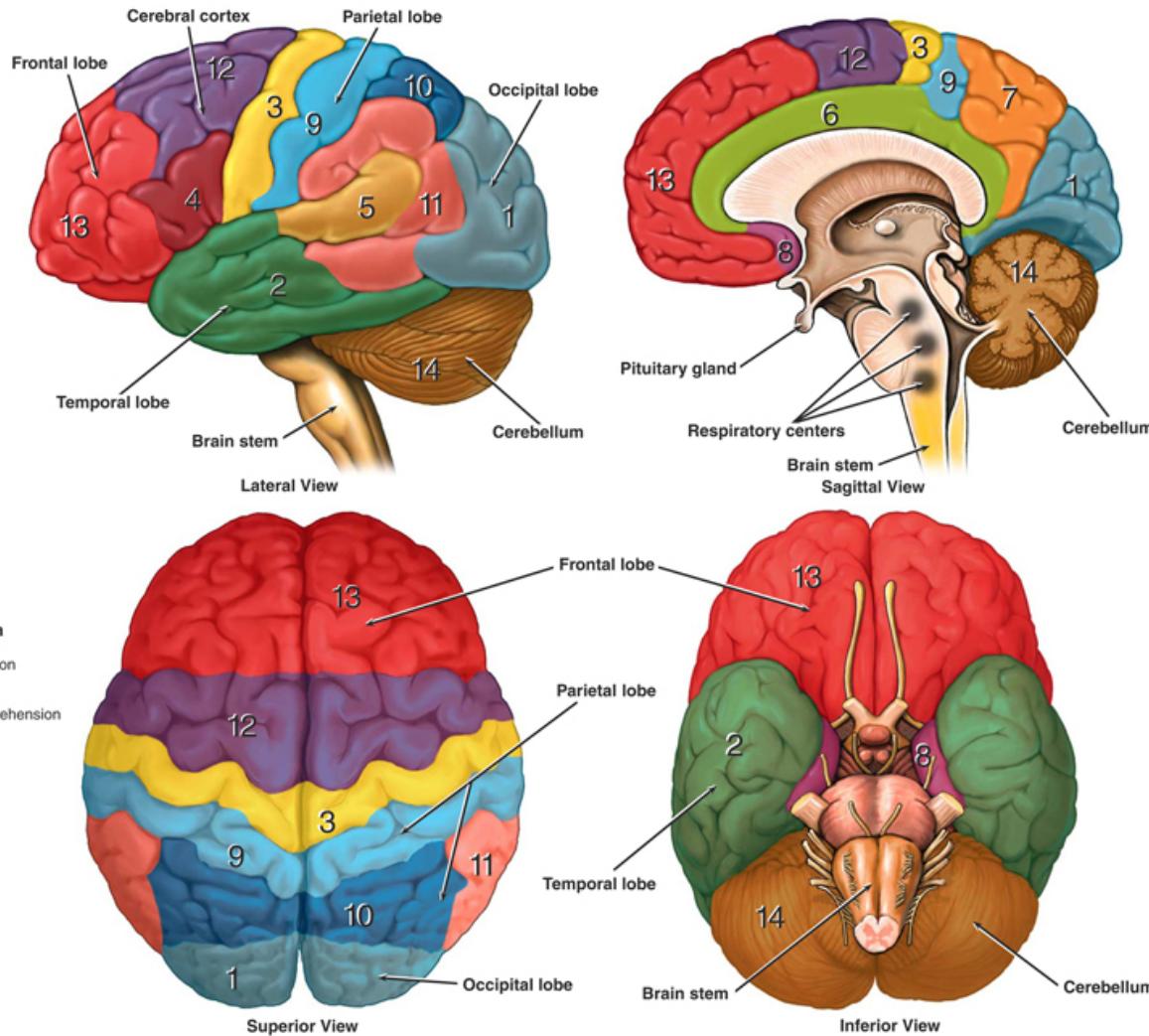


How Does the Brain Learns Best?

The human brain has evolved
to learn most efficiently by
doing

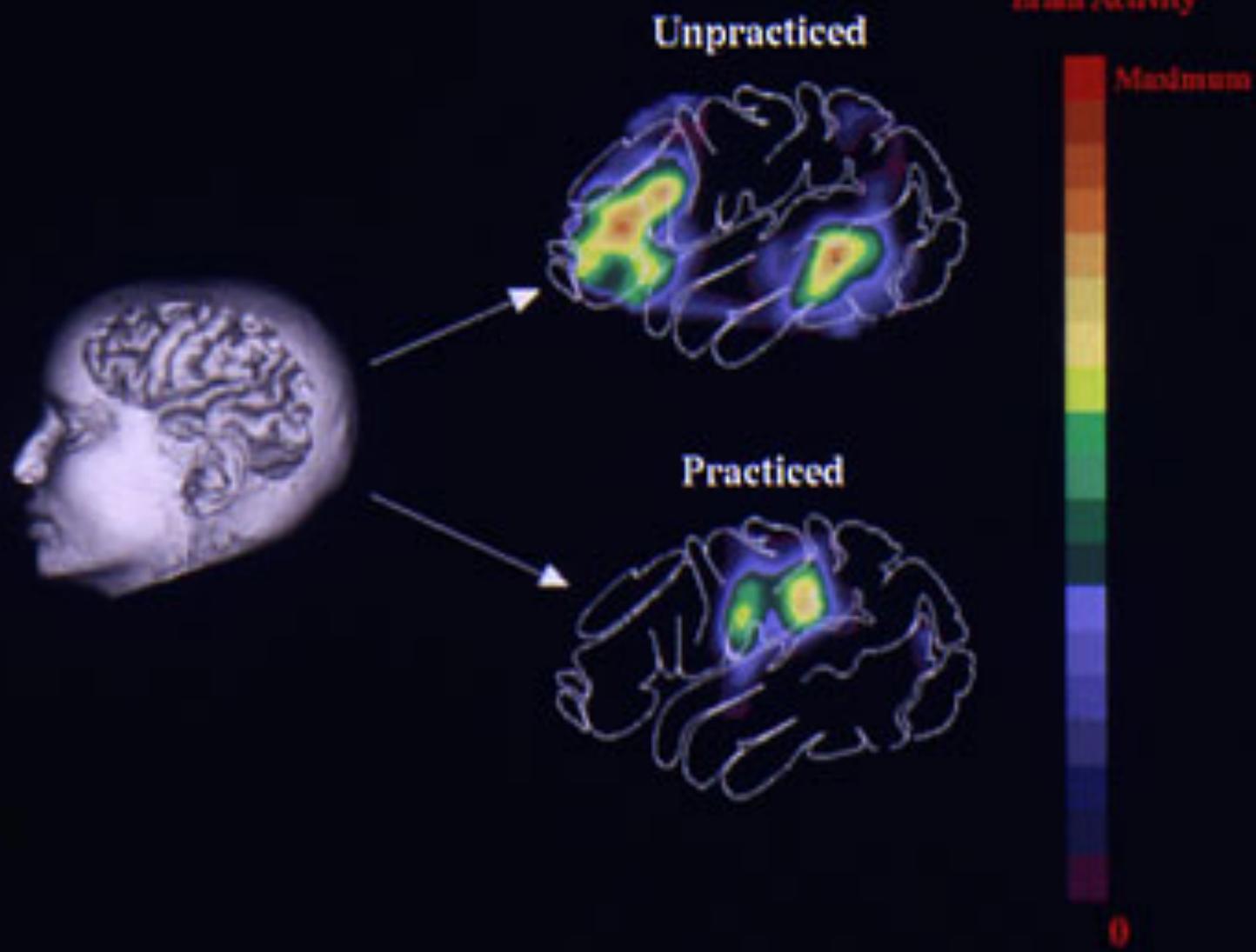
(not by listening, watching or keyboarding)

“Whole Brain” Thinking



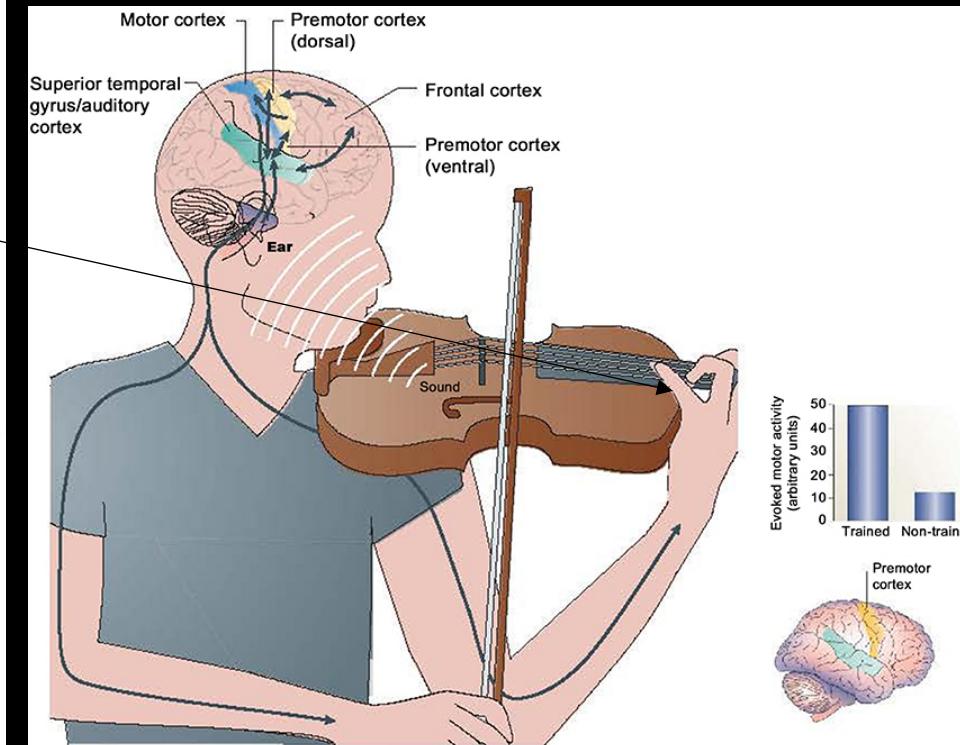
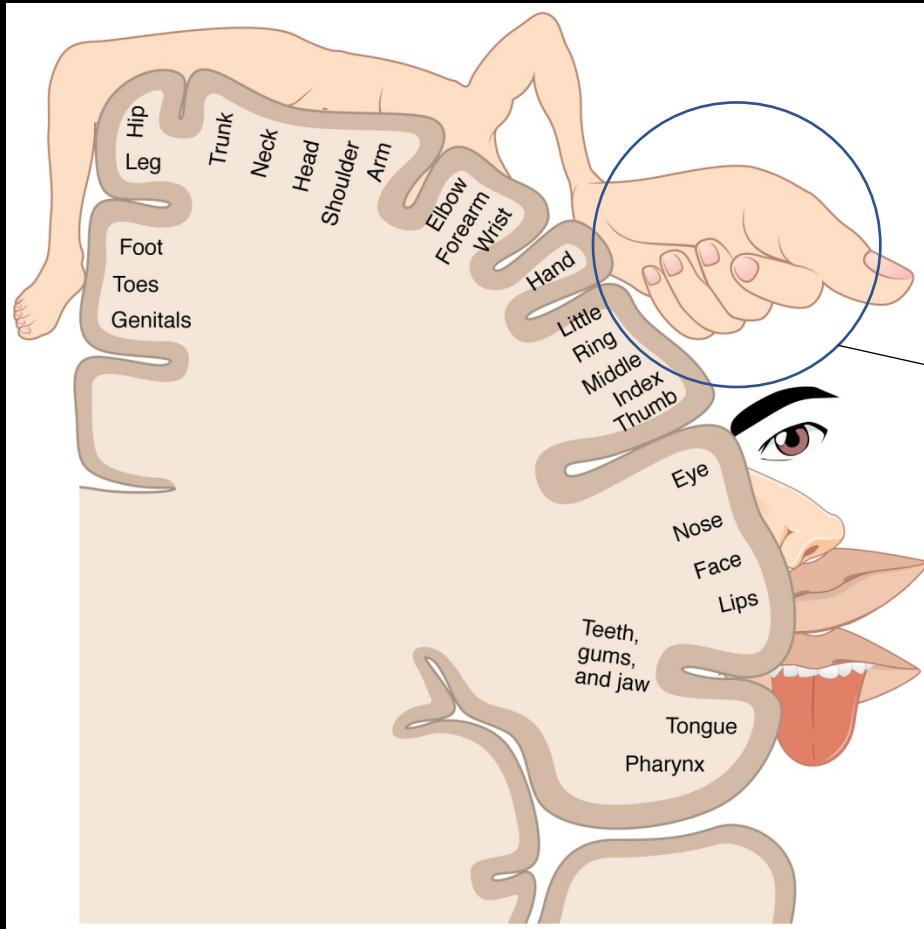
Cumulatively = “Understanding” → Apply to predictable & unpredictable

Learning a New Language Task



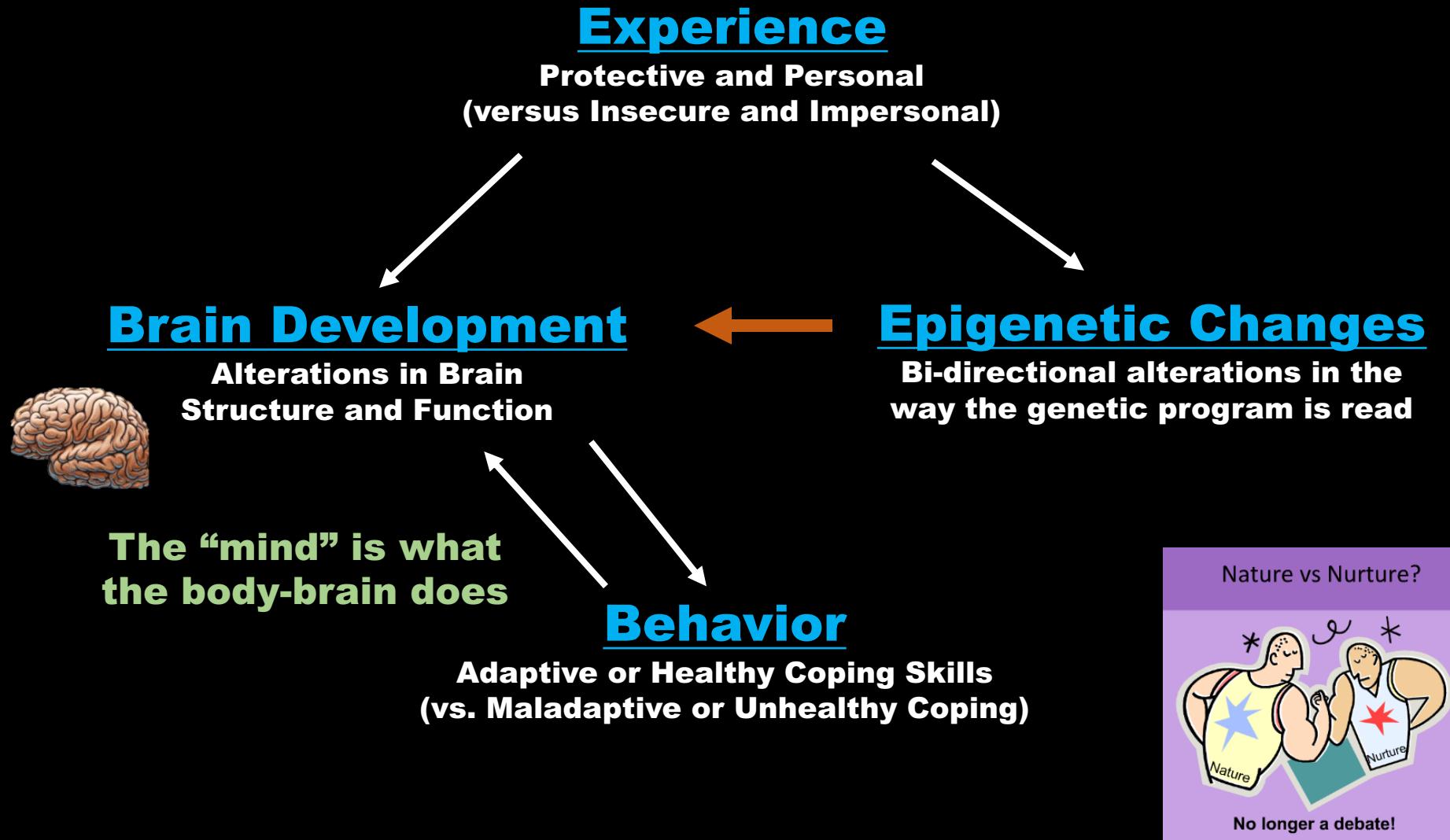


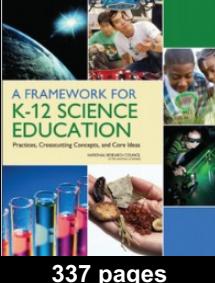
Experience → Changes in the Cerebral Cortex From Learning How To Play the Violin





Development results from an on-going and cumulative dance between nurture and nature





20+ Years of Research in Cognitive Science: High Impact Learning Strategies

1. People learn and remember best through real-world first-hand experiences, not through memorization.
2. Children are born investigators.
3. We attempt to “make sense” of all incoming stimuli through the senses, visualization, and through formal language development.





Phenomenon-based Science (Experience-based Learning)

Pheno-BL is grounded in research indicating that learning is enhanced when students

- (1) are **motivated by curiosity**
- (2) get **physically involved**
- (3) receive ongoing **feedback from the activity itself**
(not from the teacher, and not from the test).

SCIENTIFIC AMERICAN™

Curiosity Prepares the Brain for Better Learning: Neuroimaging reveals how the brain's reward and memory pathways prime inquiring minds for knowledge

Oct 2, 2014 | By Daisy Yuhas



Curiosity motivates us to find out more and helps our brains remember what we discover.
Credit: [brian donovan/flickr](#)

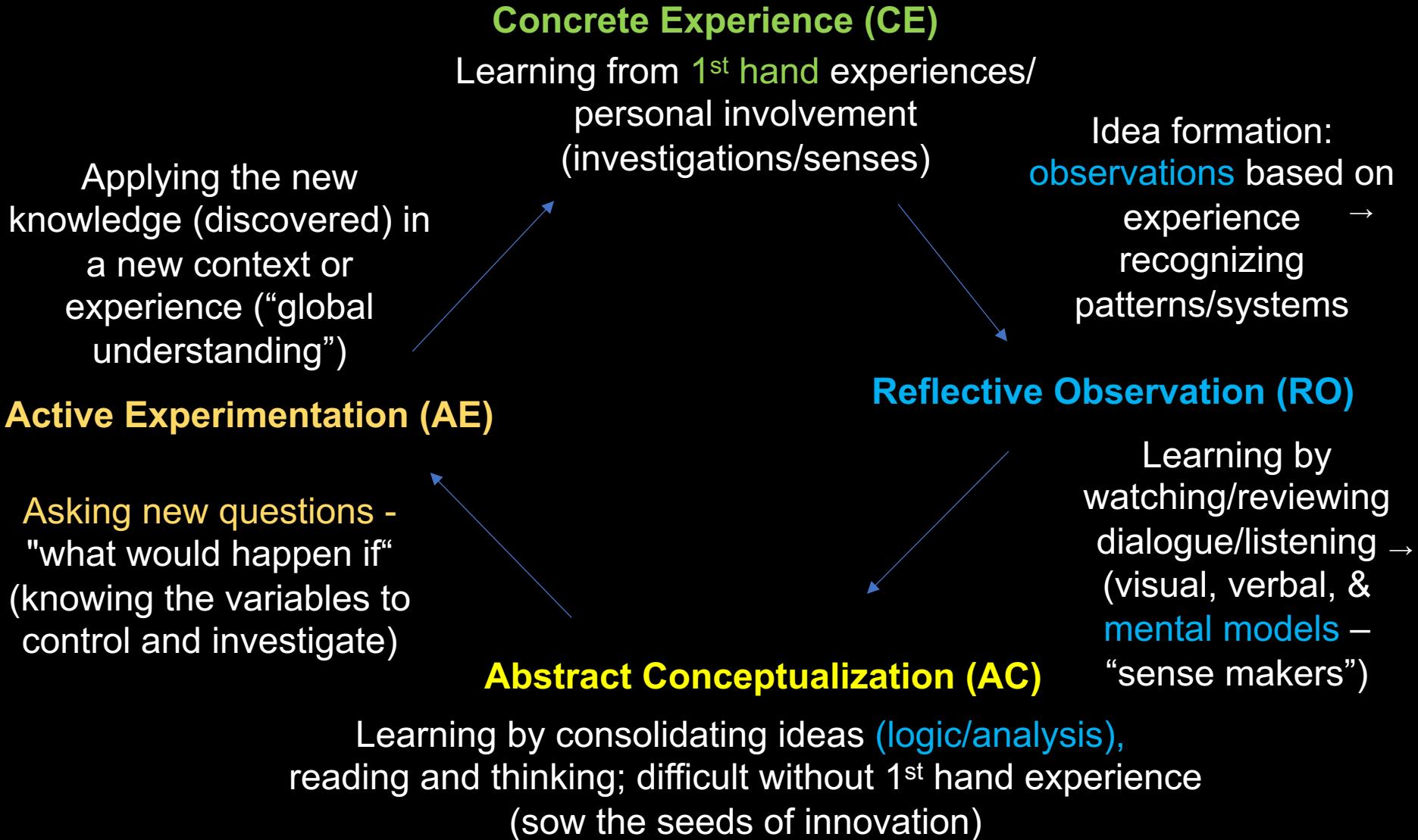
Do we live in a holographic universe? How green is your coffee? And could drinking too much water actually kill you?

Before you click those links you might consider how your knowledge-hungry brain is preparing



Kolb's Learning Styles theory

(focuses on perception and processing)





CONE OF LEARNING (EDGAR DALE)

After 2 Weeks
we tend to remember

Nature of Involvement

10% of what we READ

Reading

Verbal Receiving

20% of what we HEAR

Hearing Words

30% of what we SEE

Looking at Pictures

50% of what we
HEAR & SEE



Watching a movie
Looking at an Exhibit
Watching a Demonstration
Seeing it Done on Location

Visual Receiving

70% of what we SAY

Participating in a discussion
Giving a Talk

Receiving/
Participating

90% of what we
SAY & DO

Doing a Dramatic Presentation
Simulating the Real Experience
Doing the Real Thing

Doing

PASSIVE

ACTIVE



First, Second, and Third-hand Learning Models

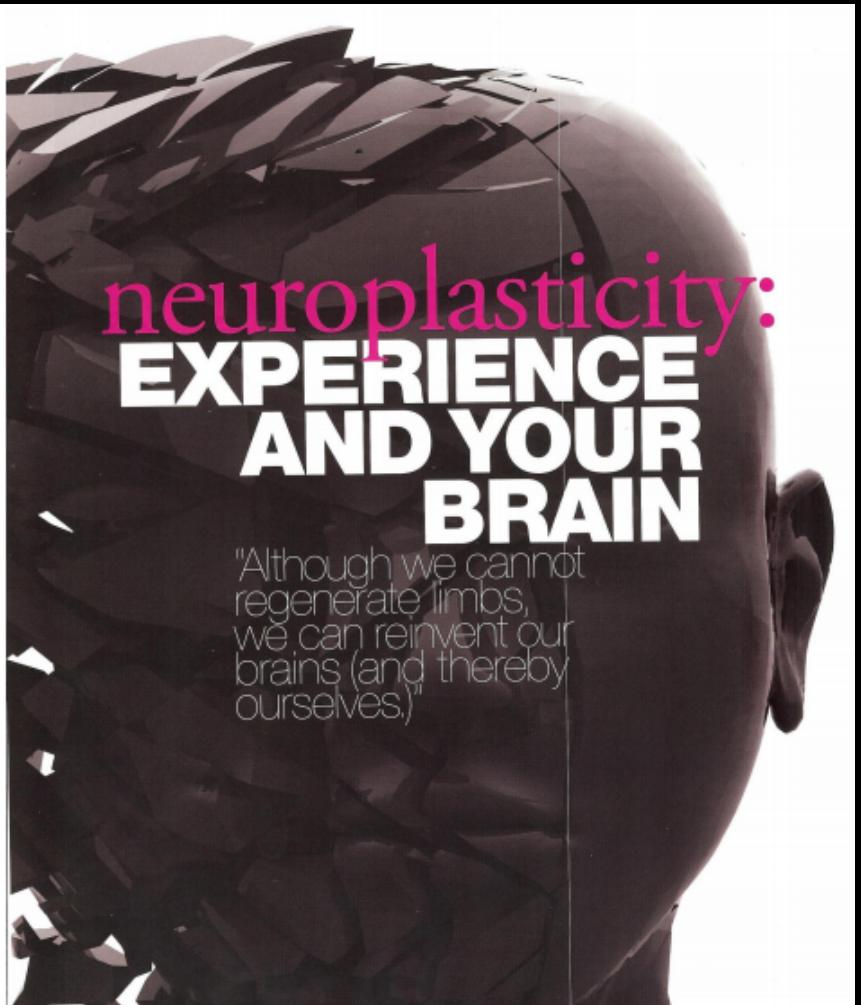
Type of Learning Experience	Memory Formation (Easily forms cortical representations)	Deep/Long-lasting Learning (Long-term learning outcomes)	Educational Time/ Dollars Invested
First-hand learning Real-world, real-time Hands-on, minds-on and hearts'-in Interpersonal/social Direct experience Note-booking	Highest ↑ Interactions → episodic memory “Leveled” readers are unnecessary; Multidimensional/multidisciplinary; Multi-sensory (high stimulation); Verbal descriptions merge with AL; Highly concrete with multiple exposures	Highest Direct experience yields the highest levels of learning and memory results; Effortless reflections/questioning; High transferability; and, Learner-centered	Lowest Meets the intended learning objectives at the same or a lower cost to the school system
Second-hand learning Pictures/diagrams/graphs Tech./simulations/models Teacher demonstrations Virtual reality/multimedia Videos/DVDs/Internet	Moderate Understanding is heavily dependent upon established knowledge and prior learning (no earlier experiences or cognitive basis for making conceptual connections)	Moderate Effective for visual learners; Fosters fragmented recall; Generates student interest; “Digital Divide”	Moderately high Requires costly tech tools/equipment/support (cannot expect tech. to be available for students in impoverished homes)
Third-hand learning Reading Lecture	Lowest Contingent upon academic lang./ personal background knowledge; Discipline-based vocabulary; Semantics/definitions are crucial; Highly conceptual; and, Easiest method to teach and assess	Lowest Students can reproduce content but <i>transferability</i> and <i>application</i> suffer when the situational context is altered (remains “surface level knowledge.”) Teacher-centered	Highest Yet this form yields the lowest cognitive returns on teaching time and school \$\$ invested



Dr. Carl Wieman, Associate Director for Science, White House Office of Science and Technology

- Most important advances in past 10 – 20 years:
Discovering the inter-relationship between
classroom studies, **brain research**, and
cognitive psychology
- **New paradigm:** Brains are very **changeable** (plasticity);
brain development and growth facilitate learning
and the ability to understand **complexity**, and its
primary role is to make **connections**.

Understanding Builds Over Time



Neuroplasticity: the ability of the brain to change **cellular, structural and functional** properties as a result of **experience**. Researchers have shown that **early** brain connections are not hard-wired (fixed) and can be **modified** by **experience** – they are malleable or “**plastic**” (not **fixed** at birth).

One of the most transformative discoveries/take-home messages

**All brains *can* change,
all brains *do* change,
brains are *designed* to change.
(That is how we *learn*.)**

RESEARCH AND THEORY REVIEW ON AGING & LEARNING

Cognitive Development Intelligence

Crystallized Intelligence

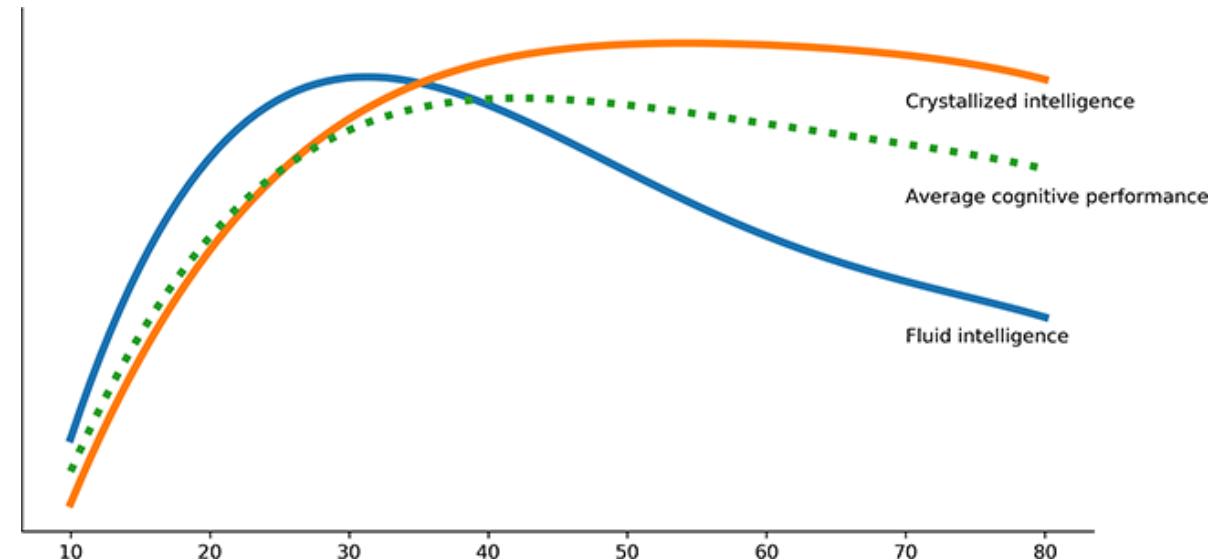
what we know from experience, culture, learning, and education

used when we try to solve problems we have seen before

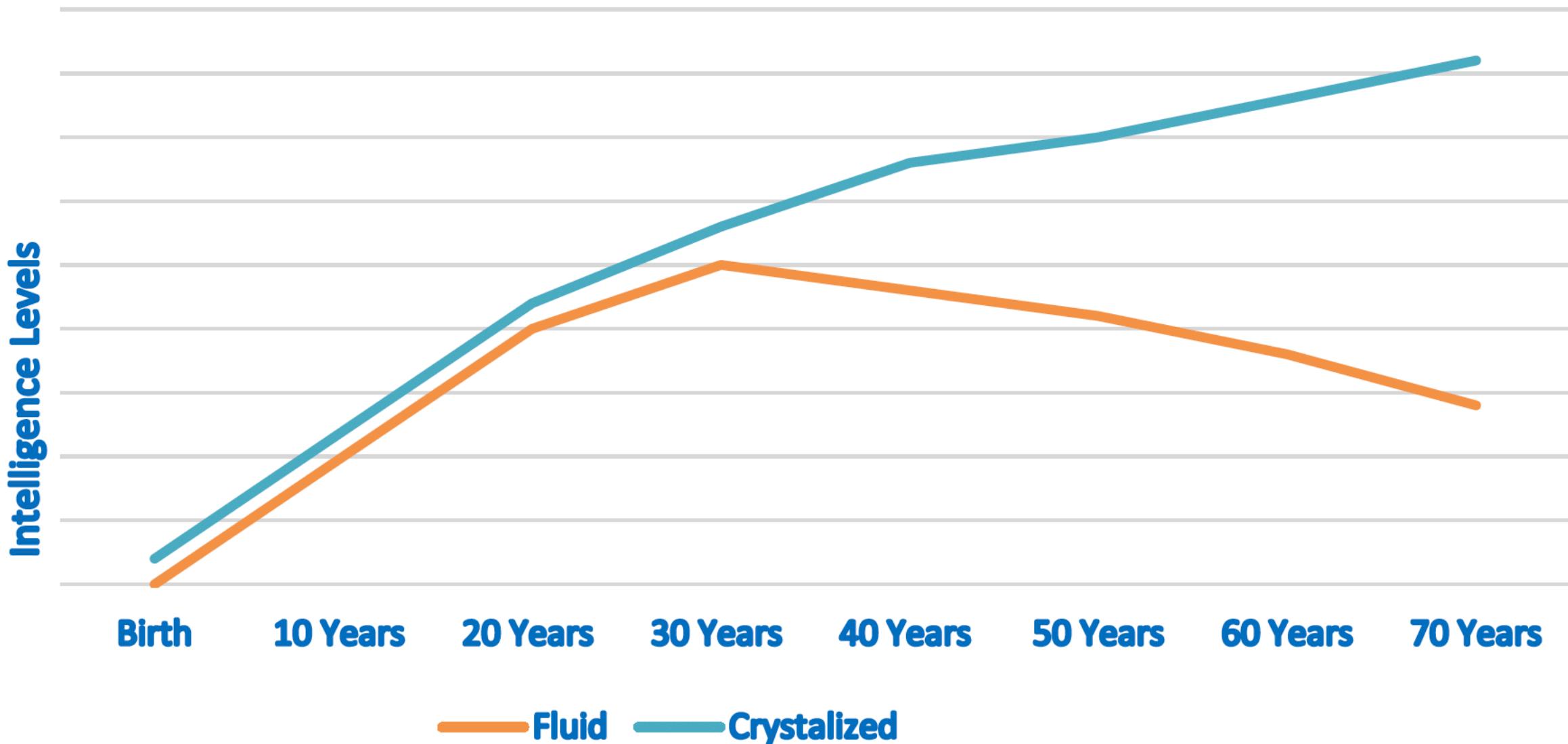
Fluid Intelligence

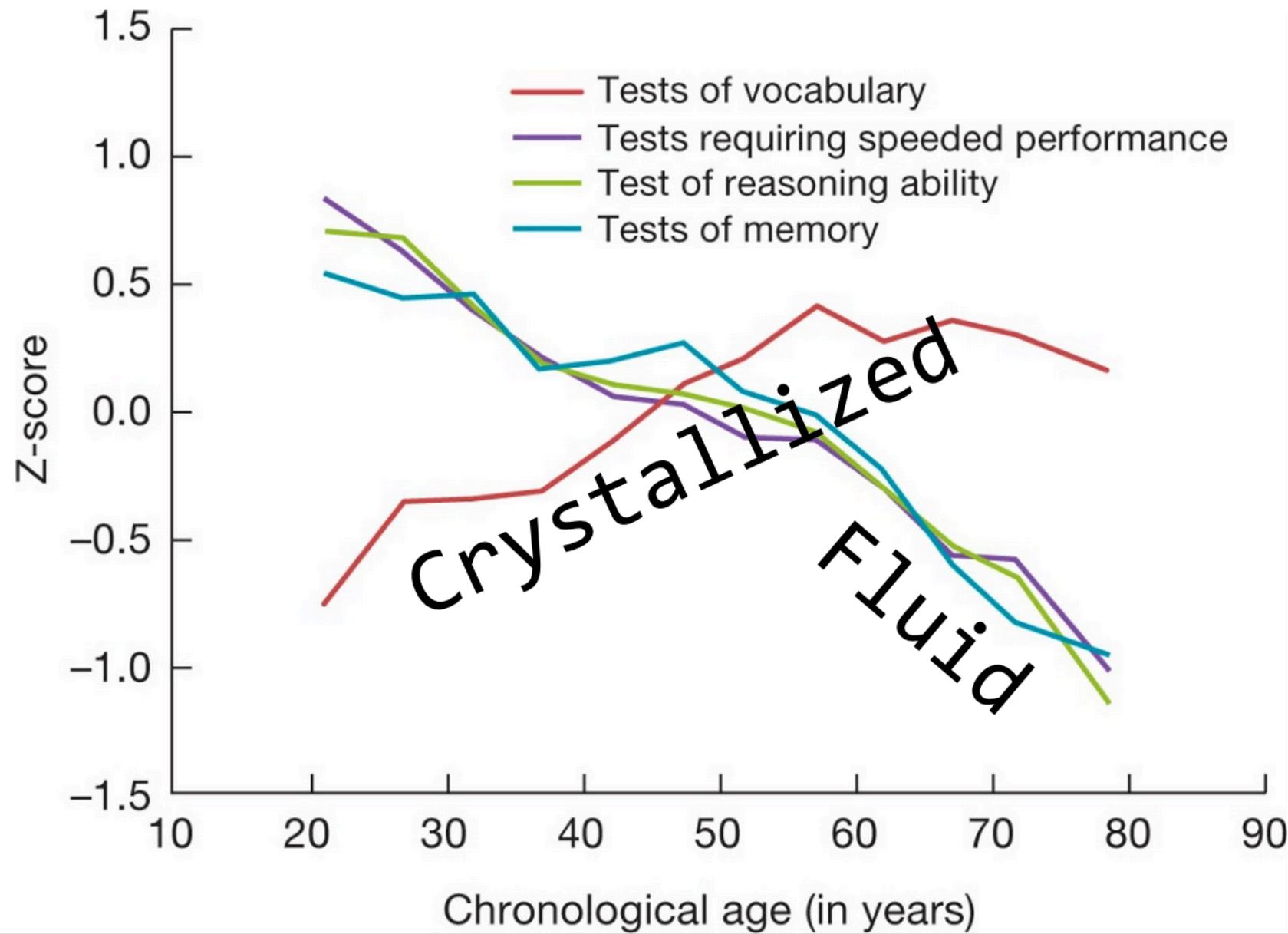
raw processing speed, mental quickness, abstract reasoning

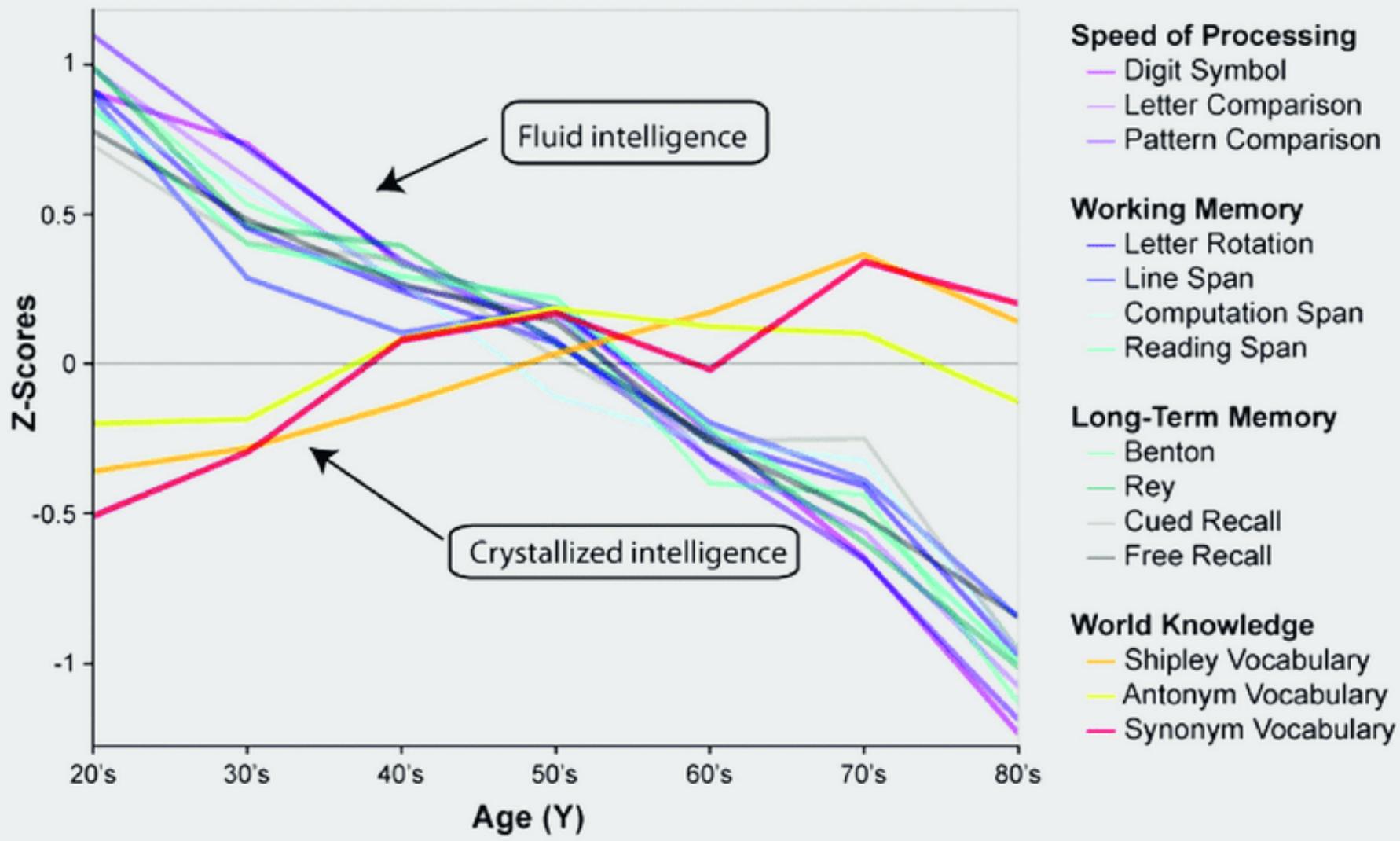
used when we attempt to solve problems we have never seen before



Fluid and Crystalized Intelligence Across the Lifespan







TAKE CARE & BE SAFE

Thank you

QUESTIONS

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