Learning with LLMs

Joe Vetta

Generation

- What do you think you are going to learn today?

Global AI MKE

Joe Vetta

VALINOR CONSULTING

What you will learn

- Effective learning techniques and myths to avoid

- How to map techniques to prompting strategies

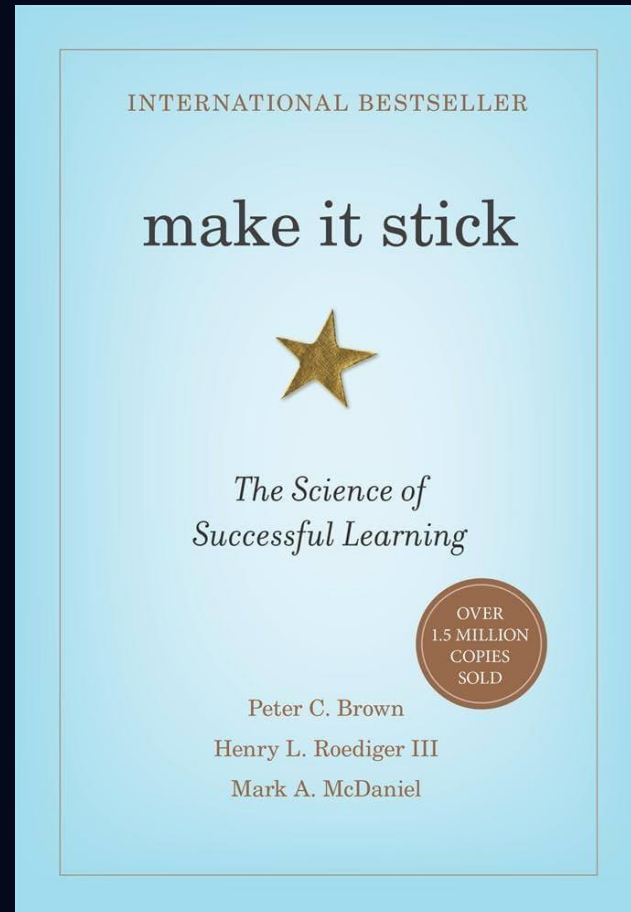- How to use LLMs as a coach/teacher/assistant

Global AI MKE   Joe Vetta

VALINOR CONSULTING

What you will *not* learn

- Code generation techniques
- Deep knowledge about demo topic
- Kung-fu

Global AI MKE   Joe Vetta

Science of Learning

Global AI MKE

Joe Vetta

Learning

- Encoding
  - Short memory traces
- Consolidation
  - Link memory traces to past experiences / knowledge
- Retrieval
  - Fetch material from long-term memory to strengthen and reconsolidate

Global AI MKE

Joe Vetta

Effective Learning - Actions

- Anchor
  - Recode/consolidate during move from short- to long-term memory
- Link
  - Associate new material with a wide range of cues to recall it more easily later
- Model
  - Develop mental models to capture a real understanding

Global AI MKE

Joe Vetta

VALINOR CONSULTING

Effective Learning - Strategies

- Spaced Repetition

- Interleaved Practice

- Variation

- Effortful Learning (Deliberate Practice)

Joe Vetta

VALINOR
CONSULTING

Spaced Repetition

- Meaningful time gaps between retrieval sessions (Anki)
- Shorter gaps for slippery material
- Longer gaps for sticky material

Global AI MKE

Joe Vetta

VALINOR CONSULTING

Interleaved Practice

- Alternate topics or deliberately take breaks between practice sessions
- More effective than focusing on the same problem or topic for an extended time

Joe Vetta

VALINOR
CONSULTING

Variation

- Vary the type and context of retrievals.

- Like interleaving

- Compare similarities and differences across scenarios, integrate related ideas/skills into meaningful schemas/mental models

Global AI MKE

Joe Vetta

Effortful Learning

- Learning and retrieval should be challenging
- Struggling and failing to retrieve a new fact makes it more likely to stick long-term
- Hence, don't repeat the same tasks and study the same things over and over
- Familiarity is not mastery!

Joe Vetta

VALINOR
CONSULTING

Quiz

- The process of learning involves encoding, consolidation, and _retrieval_ .

- How would you space out practice of slippery material vs sticky material?

  Slippery material = sooner, sticky material = later

- Instead of a long cram session, what are two better strategies to add variety into studying?

  Interleaved = switch topics, variation = switch techniques

VALINOR
CONSULTING

Effective Learning - Techniques

- Generation

- Elaboration

- Reflection

- Calibration

- Mnemonic Devices

Global AI MKE

Joe Vetta

VALINOR
CONSULTING

Generation

- Attempt to answer a question or solve a problem before being shown the answer or solution

- Before reading a chapter, jot down the main ideas you think you're going to learn from it and how they'll relate to your prior knowledge.

Global AI MKE

Joe Vetta

VALINOR
CONSULTING

Elaboration

- Find additional layers of meaning and cues
- Relate the material to something else you know
- Explain it to someone else in your own words
- Explain how it relates to your life outside of class/work

Global AI MKE

Joe Vetta

VALINOR
CONSULTING

Reflection

- Combination of retrieval practice and elaboration
- Think back to a recent experience or learning effort and ask yourself questions.
  - What went well?
  - What could have gone better?
  - What other knowledge or experiences does it remind you of?
  - What might you need to learn for better mastery?
  - What strategies might you use next time to get better results?

Global AI MKE

Joe Vetta

VALINOR
CONSULTING

Calibration

- Align your judgments about what you know and don't with objective feedback to avoid being carried away by the illusions of mastery

- Self-quiz and write down the answers.

- Resist the urge to look at question and simply say, "Yep, I know that," without answering it.

- Focus studying effort on the areas that need more work based on the objective feedback of the quiz.

Global AI MKE   Joe Vetta

VALINOR
CONSULTING

Mnemonic Devices

- Mental file cabinets, using sounds, phrases, mental palaces, spatial references, or story telling

Joe Vetta

VALINOR
CONSULTING

Live Learning Session

Global AI MKE

Joe Vetta

#	Learning Technique	Prompting Strategy	How It's Used in the Coaching Flow
1	**Retrieval Practice** Recall info from memory	🗣️ *Socratic Prompting*, *Few-shot Prompting*	→ In **Step 2**: Ask learner to recall a concept before explaining it. → In **Step 4**: Apply to past and current topics.
2	**Spaced Practice** Revisit material later	🔁 *Context-aware Prompting*, *Memory-based Scheduling*	→ In **Step 6 (Updated)**: Generate flashcards for Anki spaced repetition.
3	**Interleaving** Mix topics for flexible thinking	🔀 *Mixture of Prompts*, *Curriculum Learning*	→ In **Step 4**: Mix questions from multiple domains and ask learner to identify the topic.
4	**Elaboration** Explain in own words	🧠 *Instruction Prompting*, *Socratic Prompting*	→ In **Step 3**: Ask for explanations, analogies, or connections after each attempt.
5	**Generation** Attempt before being shown answer	✏️ *Zero-shot*, *Prediction Prompting*	→ In **Step 3**: Learner must try before feedback. Also used in concept prediction.
6	**Reflection** Think about what was learned	🔍 *Self-reflection Prompts*	→ In **Step 7**: Prompt learner to reflect on challenges, strategies, and what to improve.
7	**Calibration** Align confidence with performance	🎯 *Prediction + Confidence Rating*	→ In **Step 2 & 5**: Ask learner to rate confidence after each answer; give metacognitive feedback.
8	**Desirable Difficulties** Introduce productive struggle	🔥 *Difficulty Scaling*, *Chain-of-Thought*	→ In **Step 3**: Introduce gradually harder problems or novel situations.
9	**Discourage Passive Learning** Avoid highlighting, etc.	🚫 *Critique Prompts*, *Strategy Substitution*	→ Throughout: Redirect summary/highlight requests into retrieval or generation tasks.

Dunning-Kruger / Valley of Despair

Dunning-Kruger Effect Curve

Joe Vetta
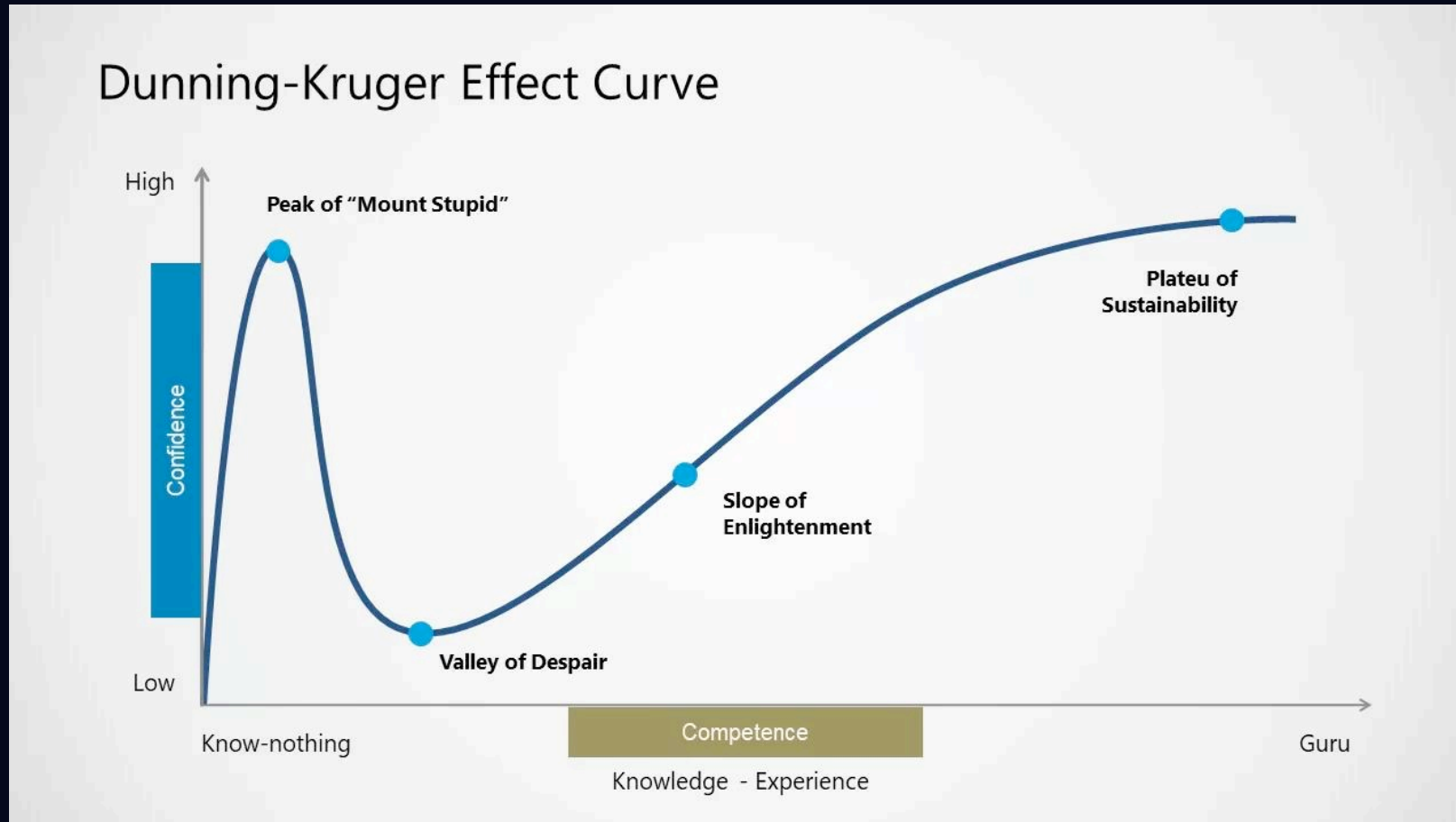
Deliberate Practice

- Set a Narrow, Specific Goal
  - Not "get better at X" but "improve how I transition between paragraphs" or "use more varied chord progressions."
- Isolate and Drill Sub-skills
  - Break down the larger skill and attack the weakest link.
- Use Immediate Feedback
  - From a coach, peer, software, or self-assessment.
- Stay at the Edge of Your Ability
  - Practice should feel uncomfortable. That's where growth happens.
- Repeat with Reflection
  - Don't just do it again — ask what changed?, what improved?, what still needs work?
- Track Progress
  - Document sessions and improvements to stay motivated and accountable.

VALINOR CONSULTING

Study Mode

- https://openai.com/index/chatgpt-study-mode/
- New ChatGPT tool
- Available on almost all plans
- Created with a prompt

VALINOR
CONSULTING

Final Exam

Global AI MKE

Joe Vetta

Resources

Global AI MKE

Joe Vetta