

Learning How To Learn (How to learn difficult and
Powerful Mental tools to help you master
tough subjects)

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Introduction to Focused and Diffuse Modes

Week 1: What is Learning?

Diffuse Mode

Focused Mode → Opening our mind

→ Getting in deep concentration to grasp new things
grasp a particular thing

* Both things are necessary

(Using the focused and Diffuse Modes (Or. a Little))

Dali will do? you have to go back and forth between these two modes

• When learning something new, our mind needs to go back and forth between these two modes

What is learning?

Our brain and neural connections are dynamic.
There are so many links formed and so many links cut off in one single day that we sleep with a brain and wake up with another. When we learn something, new connections are formed and there are still many things unknown about how brain works.

Procrastination:

Reason: when are doing something, we are not doing a lot of other things.

- ① Feeling unhappy for some painful work
- ② funnel attention onto a more pleasant task
- ③ feel happy (temporarily)

(and by young man Cirillo, early 1980s)

Pomodoro: (Italian for tomato)

Pomodoro technique

→ 25 minutes

→ no interruption

→ focus

→ reward (after 25 mins) [5 mins]

Practice makes Permanent

The more we practice the abstract things of the brain. We need to learn little by little and let the learnt things sink in and form connections for a long lasting effect.

Memory:

Long-term memory → like a storage warehouse

Working memory (immediate and consciously processing)

[pre-frontal cortex]

something like an inefficient mental blackboard

we need to revisit the long term memory portions

so that we can find them easily when needed

To set something in long-term memory we need to perform spaced repetition. We should plan to do spaced repetition without repeating at the same time at the same time for a long-term effect.

Importance of Sleep:

- Sleeping removes the toxins from the brain by relaxing our neurons
- While sleeping the neural connection of our learning task gets strengthened.
- Sleeping allows our brain a chance to rehearse difficult material-going over and over the tougher aspects of what we are trying to learn.
- There is a high possibility that we will dream about the things we are learning if we read about them just before sleep.

Dr. Terrence Sejnowski: (leading father figure of modern neuroscience)

build linking principles, from brain to behavior using computational models

learning by doing and learning by osmosis from people who are experts

(active learning)

- ask questions
- context switching so multitasking is better
- that we can think and explore different things at different times.

exercise is important for generation of neurons and getting into diffuse mode.

- Don't give up, be persistent

Benny about Learning languages

Worst reason for learning language is showing off.

- make mistakes while learning languages
- "Whether you think you can, or you think you can't, you're right." — Henry Ford

mnemonics, spaced repetitions

(mnemonic devices)

(U. of California)
Interview with Dr. Robert Bilder on Creativity and Problem Solving:

"No pain, no gain."

Five personality traits [OCEAN]

- i) Openness
- ii) Conscientiousness
- iii) Extraversion
- iv) Agreeableness
- v) Neuroticism

- * Openness to new experience is associated with great achievement
- * People with lower agreeableness tend to show higher achievement [science]

* finding the fine line between agreeableness and being disagreeable is hard
• trying to go back and forth between word and images (graphs, flows, etc.)

Interview with Daphne Gray Grant: [Writing Coach]
publicationcoach.com

- writing ← diffuse → don't edit while writing
- editing ← focused

Mindmapping: ① Take a page and vomit the ideas (horizontal view) [link the events]

Memorizing helps understand thing deeply

Week 2

(continued to 3)

Chunking:

Mental leap that helps you unite bits of information through meaning

- unite scattered bits of information

through meaning

Once you chunk an idea, a concept, or an action, you don't need to remember all the little underlying details

→ Chunking is the mental leap that helps us unite scattered bits of information through meaning and understanding.

How To Form a Chunk:

→ When we're first trying to understand how to work a problem, we have a huge cognitive load.

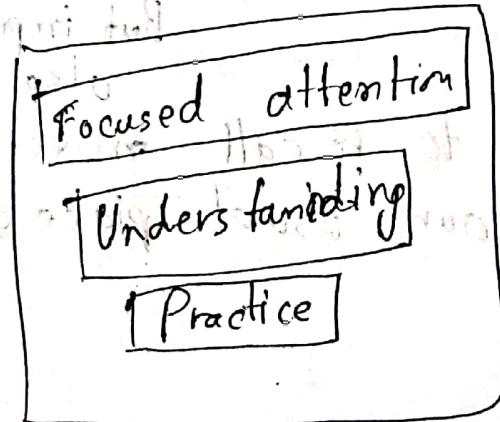
→ working out with a work-through example is a nice way to start

Don't follow a mindless example technique to solve a problem.

our each step

Steps

- focus ~~on~~ undivided attention on the information we want to learn chunk
- when we are learning something new, & we are forming new neural connection with our pre-existing connections
- Understand the basic idea we're trying to chunk
- we understand something well when we do it by ourselves
- Graining context → how to use that chunk
(big picture) (chunking)
- Both top-down and bottom-up learning is necessary to grasp anything. Context is where these two meet.



Illusions of Competence, Importance of Recall

Mini-testing and Making Mistakes.

→ Recall: after we've read the material, simply look away and see what you can recall from the material

→ This process helps to build neural tracks that we can hang our thinking on.

→ Illusions of Competence: Glancing at a solution and thinking we truly know & know it is one of the most common illusions of competence in learning.

• be careful of highlighting and underlining

• Testing our learning to not fool ourself into illusions of competence (Making mistakes is fine)

But improving from them is also necessary

• We should try to recall materials when we are outside our usual place of study

Seeing the Bigger Picture

What Motivates You?

Neuromodulators are

chemicals that influence how a neuron responds to other neurons.

• Acetylcholine ← important for focused learning

• Dopamine ← our motivation is controlled by it

• Serotonin ← affects social life and risk-taking behavior

Severe loss of dopamine neurons causes resting tremor, slowness, rigidity ← Parkinson's disease [catatonia → complete lack of any movement]

* Emotions are intertwined with perception and attention and interact with learning and memory.

The Value of Library of Chunks: Compaction, Transfer, Creativity, and the Law of Two

Serendipity

Compaction → The more we practice the subject we are learning, the better our chunks get.

Transfer → Concepts in one field can be used in another.

If we have compact chunks we can just listen to our diffuse mode and find ideas.

Two ways to figure something out.

Sequential (Focus)

Holistic (Diffuse)

Solutions from diffuse mode should be very carefully verified using focused mode

Law of Serendipity: (Lady luck favors the one who tries)

Overtaking, Choking, Einstellung, Chinking, and Interference

② Continuing to practice after we've mastered what we can in a session is called overlearning.

Overlearning can produce automaticity when we choke in something overlearning and automaticity can be especially valuable.

• Repetitive overlearning can be a waste of learning time.

Repeating something we already know can bring to illusion of competence.

Deliberate Practice is deliberately focusing on what we find more difficult.

Einstellung: (Mindset) installing a roadblock because of the way we were initially looking at it.

→ Mastering a new subject means learning not only the basic chunks, but also learning how to select and use different chunks.

Interleaving: Jumping back and forth between problems that require different techniques.

starts building flexibility and creativity

Most paradigm shifts in science are brought about by young people or people who were originally trained in a different discipline

- Learning can come from anywhere.

Dr. Norman Fentonberry - Learning at MIT,

- Engineering is a team sport.
- get the things you want to learn in different ways
- what you think you know, you find out when you try to explain it to somebody else that's why teaching is one of the best ways to learn [Active Learning]

Scott Young, "Marco Polo" of learning:

- test yourself as often as possible
 - take a blank paper and try to teach someone else explain like you're teaching
- Feynmann → It's very important that the first rule is not to fool yourself. But you know the easiest to fool is yourself.
- use analogies to learn

new ideas by analogy testing
difficult to spot if you're not really doing it right