

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

(mnemonics, spaced repetitions)

(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](http://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 things 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.

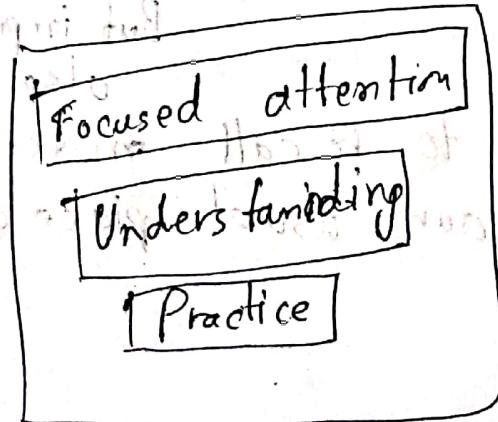
→ working out with a work-through example is a nice way to start

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

- use analogies to learn

new ideas by analogy testing  
difficult to do. If you put really  
difficult things in to start learning

## Week 3 - Procrastination

### Procrastination and Memory

#### Tackling Procrastination

It's easier and more valuable than we think

- Pomodoro

The higher we go in our studies, the more important it is to take control of procrastination

→ Procrastination is not an innate behavior

→ Even if we look healthy with procrastination we're not. We're gonna face long term problems

#### Zoombies Everywhere!

Once we chunked our learning, it gets easy to do the same thing

#### 4 parts of habit

- 1) The cue (what starts it)
- 2) The routine (the habitual mode)
- 3) Reward
- 4) The Belief

## Surf is Up: Process vs Product

### Process

habits and actions associated with that

flow of time

~~This helps us~~

We need to focus on processes like going through the 25-minute Pomodoro method most part of the day. For now, Harnessing habitual powers

### Product

### outcome

we need to concentrate on avoid this for tackle procrastination

### 1) The cue

- location

- time

- feeling

- reaction

### 2) The Routine

- plan

### 3) The reward

### 4) The belief

## Juggling Life and Learning

- Weekly list of key tasks
  - Daily to-do list
- Make the to-do list before sleep
- Keep break time and leisure

## Memory:

Deep Dive: Our mind is built to retain general

information about a place

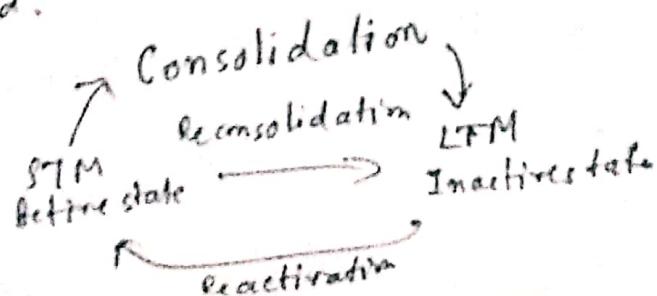
\* Writing something out deeply encodes the information into our memory

Build flashcards on the things you're learning.

This helps interleaving

## Long Term Memory: (hippocampus)

Without long-term memory system, we cannot store the new things we learned.



- Astrocytes are brain cells that
- provide nutrients to neurons
  - maintain extracellular ion balance
  - Are involved to repair after injury
  - Have a role in learning

## Creating Meaningful groups and the Memory Palace

- If we want to remember something in a large chunk, it's better to group them in a easier way to remember them.
- Memory Palace Technique:
  - Pick a favorite place to you and try building neural hooks to the place so that you can remember the thing whenever you remember the place.

# Interview with 4 time US Memory Champion [Nelson Dellis]

Memory techniques involves two things

- i) Visualization
- ii) Attach the image to some location
- Interact with people to remember the names
- 4 kind of key dimensions in brain health to stick to
- i) keep the brain active
- ii) learn new skills
- iii) physical activity
- iv) be social

Dr. Robert Gramache (Award winning Bilingual Scientist)  
↳ dyslexic

- practise every for a short time
- hardwire your brain to solve problems by repetitive practice
- if you're stuck with a problem, get to diffuse mode