## KNOWLEDGE

EMPATHY

## WRITING <br> ON READING PT. 2 <br> UNDERSTANDING

Hoquence
vocabulary

## One Stride At a Time

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## Introduction

The objective of this three-part article series is to answer the following:
Why we read - How to read (and remember) - What to read
The "Why we read" aspect is covered in Part 1. I suggest you have a look at it.
Always forgetting what you read? This second part covers aspects around how to remember what you have read, and to substantiate this, the Feynman technique is presented, which is an excellent technique to help understand and recall what you read. Let's get into it.
(Note: Every time I say reading, I mean "Active Reading", i.e., engaging with what you are reading.)

## Understanding and remembering what we read

The worse thing that can happen after you are done reading something interesting is forgetting what you read. It takes a few hours for some, a few days for others. Personally speaking, if I engage with material only once, after 2-3 days I can only remember a small percentage of whatever I read. I've been particularly horrible at remembering a lot of what I read, and this pushed me to do a bit of research on this. I'll touch on some ways to remember what we read better, but let's first have a look at the concept of "forgetting".

Here comes The Forgetting Curve. This is a curve that shows how fast we lose information over time (forget)when we don't engage with it, or when there is no attempt to retain it. This curve shows that human beings tend to half their memory of recently learned material in a matter of days unless they deliberately review it. This curve originates from the German psychologist Hermann Ebbinghaus' (H.E) self-study between 1880 and 1885. He created a list of nonsense syllables (syllables created by using a consonant-verb-consonant sequence, e.g., WID, GAC, DOD etc.) and tried recalling them after different lengths of time. That's some dedication right there.

# FORGETTING CURVE \& SPACED REPETITION 



Figure 1:Forgetting Curve \& Spaced Repetition (Source: Mindtools)
The forgetting curve indicates that after a couple of days, we forget about half of what we've recently learned. By the end of a week, we have forgotten about everything. If we refresh our mind (via actively recalling information and then reviewing what we had forgotten) after a day, it resets the curve. This done multiple times (at different time intervals) is called spaced repetition.

According to his experiment, the basal forgetting rate differs little between individuals (i.e., in general, people forget at about the same rate). He also points out that the speed of forgetting depends on factors such as sleep, stress, difficulty of learned material, and representation.

His proposed methods to increase the strength of memory are:
Spaced repetition: Actively recalling information freshly learned after 24hrs resets the forgetting curve (remember, we forget the most after the first 24 hours). This reset needs to be done over spaced periods with the spacing between the resets increasing over time (from days to months).

Better memory representation: There are various ways to create better memory representation of concepts/ideas you are reading on. The idea here is to package the information in a way that your brain can easily recall. Mnemonic techniques are a good example (remember ROY G BIV? It's an acronym for the spectrum of colors red, orange, yellow, green, blue, indigo, violet).

Overlearn: H.E figured out that putting in more effort than the typical amount of effort when you learn something slows down forgetting.

Make the information relatable: Information that is not relatable is difficult to associate with things you already hence, difficult to recall.

Ebbinghaus' self-study serves as a good introduction to the mechanism of forgetting and ways to retain information better. There are other techniques that can help with information retention, I will only touch on one that I particularly like, it is called elaborative rehearsal. Elaborative rehearsal helps with storing information that can be understood (not a random string of numbers for example, but rather, concepts/ideas, methodologies etc.) in the long-term memory. I briefly touch on the long- \& short-term memory below before diving into elaborative rehearsal.

When information gets into our brains, it is initially stored in the short-term memory (This memory is limited by space and time i.e., you can only store a limited amount of information and it can only stay in this memory for a relatively short time) after which it moves to the long-term memory, or it is forgotten. You can either understand a concept for it to move to the long-term memory or force yourself to remember via rote memorization. As you would imagine or already know, information that is understood is easier to transfer into long-term memory. Weird enough there are some things we only need to experience once (watch or read) and we never forget about them, I won't touch on such in this article.

## Elaborative Rehearsal

This is a technique used to understand and retain information for a longer period. Information retained using this technique usually stays in the long-term memory. The technique involves processing information at a deep level by engaging with it (i.e., linking what you are currently learning to what you already know), and moving it from short-term to long-term memory.

There is another type of rehearsal called Maintenance Rehearsal (Rote memorization). It involves cramming information by saying or thinking about it numerous times. It helps when trying to recall dates, names, historical occurrences etc. Not for understanding concepts and ideas.

Understanding equates to remembering, because material understood moves to the long-term memory, hence I decided to combine all the tips for remembering and understanding together. Below are ten ways to remember and understand what you have read (You can think of them as elaborative rehearsal techniques). I have omitted the obvious ones such as focusing on what you read or taking notes for example.

1. Purpose: To make deliberate reading easier to recall, figure out what is relevant for you to read at the moment. Answer the question "What do I want to read and why?". Do you have issues with your finances? Do some research and determine the best books that can answer your questions. This simple step primes your brain to receive such information, and it becomes easier to remember as it is associated with an actual problem you are facing.
2. Putting information into your own words: By doing this, you are forcing yourself to break down what you have read and express it in a form you are more familiar with. This helps in understanding and retaining information better.
3. Coming up with questions on what you are reading and answering them: This is a technique high-performing students used in top colleges in the U.S as Cal Newport pointed out in his book How to Become a Straight-A student. By coming up with questions about the subject matter you are reading and answering them to a satisfactory level (this should be spaced out for better retention), you gain a better insight into what you read. This technique works pretty well, I used it in my college years, resulting in shorter study time and better results. It's not just useful in an academic context though, but rather for any form of informative reading.
4. Using pictures/images to help you understand what you are reading: Research has already proven that the human brain remembers pictures/images better than words. Whenever you read new material, try visualizing it or finding images related to it, that makes it significantly easier to recall. I think this depends on people, some seem to be very inclined to visuals, but I've met a few who understand the text as it is, without a need to attach it to any form of image or visual. Figure out what works for you and find ways to become better at that.
5. Categorizing what you are reading (when possible): How easy is it to get a specific shirt from a box that has pants, shoes, shirts, blazers, vests, underwear etc. all crumbled together? In my experience, it's a bit more difficult than finding that same shirt in a box that only has shirts in it, properly folded and organized according to color and style for example. (By the way, I mean getting that shirt in one try). Whenever information can be classified, doing so makes it easier for the brain to recall the information.
6. Using mnemonics: I suspect a lot of us used such techniques in primary and secondary school. Creating sentences or acronyms with the first letters of names we are trying to remember for example. I think mnemonics are quite effective when it comes to names in particular.
7. Spacing out your learning: Remember the Forgetting Curve? The more you space out your learning and actively recall material learnt, the more it moves into your long-term memory.
8. Association: To transfer information to long-term memory, it is helpful to link it to the information you already know. Osmosis.org describes human knowledge as a network of nodes that have links. Each node can be seen as a concept. If you link multiple nodes to a new one that is being created, they are activated when trying to recall the new concept and in turn, the new concept is activated. Association is about surrounding what you are trying to learn with something you already know. That's why it's important to have good general knowledge, it makes your "nodal circuit" (just made it up, but hopefully you get my point. If you don't get it forget about it) broader, and you can link more new nodes. Memory palaces are a good example of visual associations.
9. Instant practice: This one is purely from personal experience. To solidify your understanding of a subject matter, apply what you have read as soon as you can. This will show you aspects you might not have considered when solely reading. If you read on ways to run, you'll only fully understand and appreciate if that knowledge was right or wrong after running yourself. In a similar vein, you'll only be able to appreciate the knowledge presented in this article if you put it to the test.
10.Personal summary: This forces you to actively recall what you have read and write it down in a concise form. This allows you to think through what you have read and highlight the most important aspects in your mind, before writing them down.

## 10 TIPS TO UNDERSTAND AND REMEMBER WHAT YOU'VE READ

## 1. DEFINE THE PURPOSE OF YOUR READ

To make deliberate reading easier to recall, answer the question "What do I want to read and why?". This primes your brain to receive the information.
2. PUT INFORMATION INTO YOUR OWN WORDS

Force yourself to break down what you have read and express it in a form you are familiar with.
3. COME UP WITH QUESTIONS AND ANSWER THEM

Coming up with questions about the subject matter you are reading and answering them to a satisfactory level helps you gain a better insight into what you read.
4. USE IMAGES WHERE POSSIBLE

The human brain remembers images hetter than words. Visualize the material you are reading or try find images related to it. It will help facilitate your recall.
5. CATEGORIZE WHAT YOU ARE READING

Whenever information can be classified, doing so makes it easier for the brain to recall the information.

## 6. USE MNEMONICS

Quite effective to recall names, and groups of words. Remember the color spectrum? R-O-Y-G-B-I-V

## 7. SPACED OUT LEARNING

The more you space out your learning and actively recall material learnt, the more it moves into your long-term memory

## 8. ASSOCIATION

To transfer information to long-term memory, it is helpful to link it to information you already know.

## 9. IMMEDIATE PRACTICE

To solidify your understanding of a subject matter, apply what you have read as soon as you can. This will show you aspects you might not have considered when reading.
10. PERSONAL SUMMARY

This forces you to actively recall what you have read and write it down in a concise form.

The above, are pointers I organized from the various sources I found, but there is a dedicated technique to understand what you are reading, it is called the Feynman Technique.

## The Feynman Technique

Considered by some as the best way to learn anything, this technique was put forth by Richard Feynman, a Nobel prize-winning American theoretical physicist (amongst other things) who lived between 1918 and 1988. He was acclaimed as one the greatest science teachers, with the ability to break down and explain complex scientific principles in plain and easy-to-understand language. This technique is derived from Feynman's studying methods when he was a student at Princeton.

To get the best out of this technique, have a notebook or something to write on when going through the steps of trying to understand a concept. This technique consists of 4 -steps as shown below:

1. Identify the subject: The aim of this step is to write down all you know about a subject after you have studied it.

- Pick a subject
- Read about it
- Review it in your mind
- Get a notebook or paper and write that subject as a title
- Write down all what you know about that subject (from your mind).
- Add any additional material you study in those notes.

Once you are comfortable with that, move to the next step.
2. Simplify it (Teach it to a child): Let's point out 2 key limitations of a child (Around 10-12 years old):

- Cannot understand dense vocabulary or jargon.
- Has short attention span

You need to be able to explain a complex concept to a child while considering the above limitations. Definitely not an easy task. Ensuring this is possible will force you to understand the concept better and be creative in how you write it down. The less jargon you use, the better grasp you have of a concept. Use analogies and visual references when possible.

In this step take the notes you've already made and simplify their language for a child to be able to understand. Once done, go and explain it to people you know and see if they understand. They will probably have questions for you that you can use to further your understanding of the concept.
3. Identify your knowledge gaps and fill them: Simplifying the language of your notes will allow you to find the gaps you have. Write them down and research on each of those gaps thoroughly. Once you have covered those gaps, you can move to the next step.
4. Review: Once you have closed your gaps, piece your notes into a concise tale. You can read it out loud to figure out where the language seems complex or where something does not make sense for example. Use analogies to strengthen your understanding.

Once done, go and run it by a few people again and figure out if they understand it better. Once you are satisfied with the level of understanding you obtained and the quality of your notes, keep them in a safe place (having a digital copy will be best I think). Whenever you want to refresh your mind on that concept you can use those notes.

|  | 1. IDENTIFY THE SUBJECT | WRITE DOWN ALI YOU KNOW ABOUT A SUBJECT After You have stulied it |
| :---: | :---: | :---: |
|  | 2. SIMPLIFY IT ITEACH IT TOACHILD] | Explant the Concept you have studieg such that a child can understand Ishould be voin of Jargon and concisel |
|  | 3. IDENTIFY KNOWLEDGE GAPS AND FILL THEM | AFTER STEP 2, YOU WIIL FIND GAPS, WRITE THEM DOWN AND RESEARCH ON THEM |
|  | 4. REVIEW | ONCE YOU ARE DONE, PIEGE YOUR NOTES INTO A CONCISE TALE. REVIEW THEM AND ONCE SATISFIED WITH YOUR UNDERSTANDING, KEEP YOUR NOTES IN A SAFE PLACE. |

We have through why we read and ways to understand what we read. Next, we will look at how to read a book. You obviously know how to read right? Well...
Let's see.

## Conclusion

This article touches on ways to understand and remember what we read. Some research done by Ebbinghaus is presented, depicting the forgetting mechanism and ways to strengthen memory. Elaborative rehearsal which helps in understanding what we read better is equally presented. The article closes off with the Feynman Technique, an absolutely brilliant technique to help one get a better understanding of concepts, subjects etc.

I think the content of this article will be relevant to anyone who is trying to continuously learn in life. The worst thing that can happen after you read something of interest is to forget about it.

I hope you enjoyed this article. The third and final part will cover the aspects "how to read" and "what to read".

What's your best takeaway from this article? Let me know in the comment here.

