How to take smart notes

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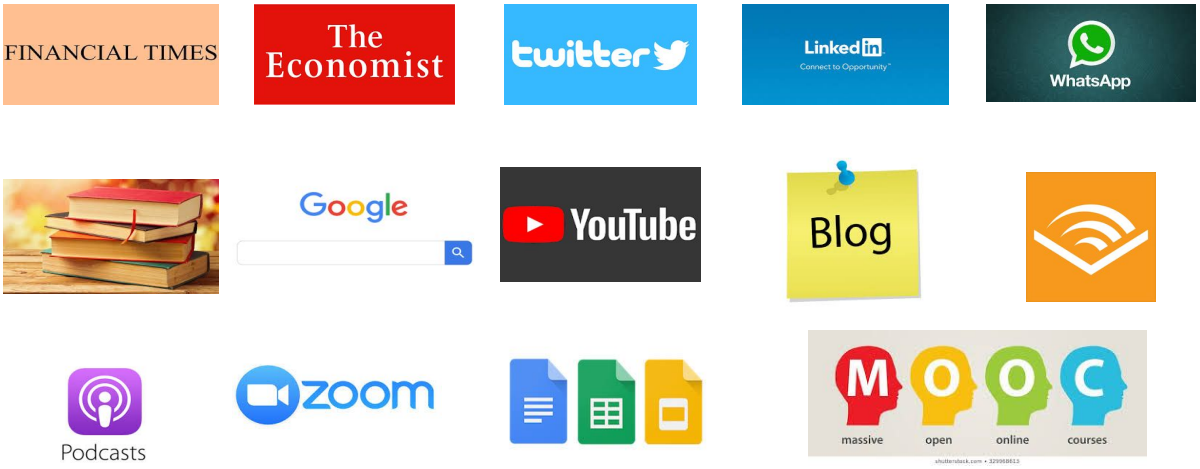
We are all knowledge workers

Knowledge workers are workers whose main capital is knowledge. Examples include programmers, physicians, architects, engineers, scientists, design thinkers, lawyers, academics, and several others. Their line of work requires one to "think for a living."

Sources from where I consume my information



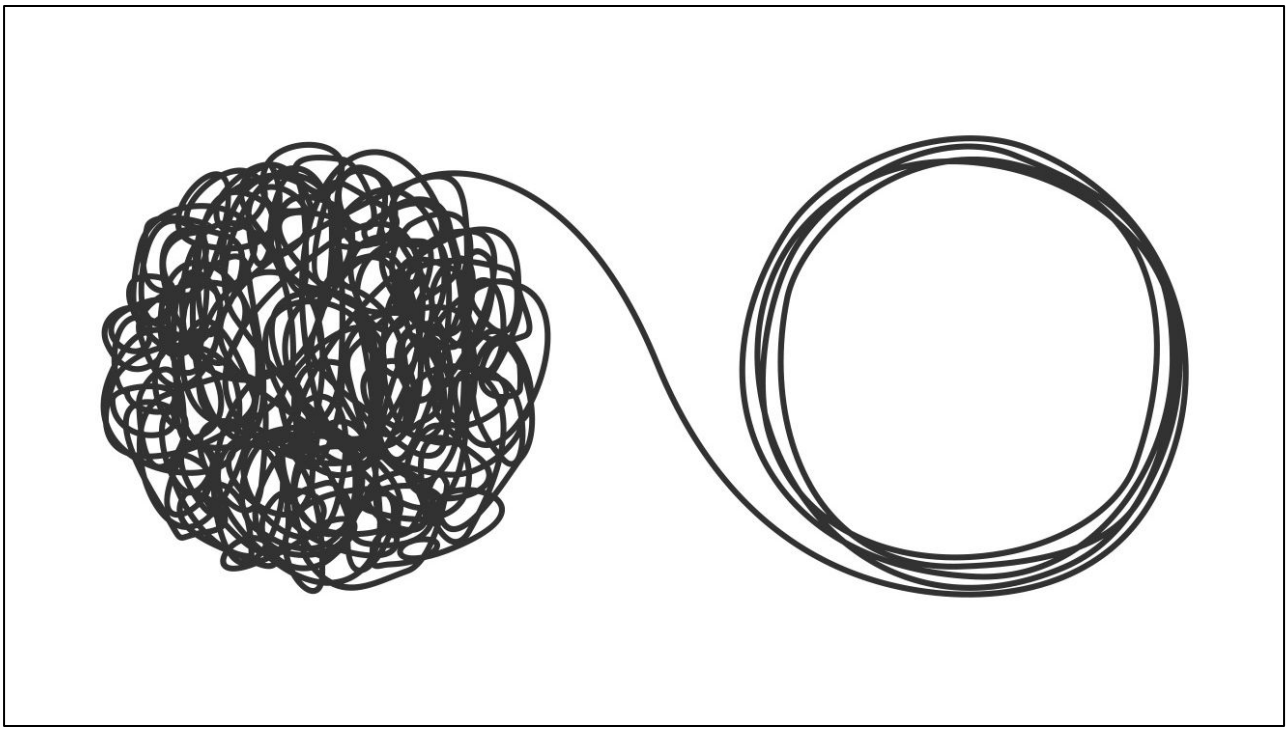
On top of these sources, I consume a lot of information from S1, 10K, conference call transcripts, and analyst presentations.

We consume 1-10 GB of information daily.

To put this in perspective 1GB can store 1000 books on Kindle.

The processing capacity of the conscious mind has been estimated at 120 bits per second.

Even if our conscious mind processes information continuously for 24 hours we can only handle 1MB daily (120 * 86400 / 8 / 1024 / 1024). The information we need to process is 100-1000x more than what our conscious mind can process.



How to create order out of chaos?

Principles for effective learning

Retrieval practice

A group of eighth graders studied science for 3 semesters. They were quizzed on some modules. On other modules they were asked to reread the material without quizzing. Did students score high grades on quizzed or the modules they reread?

At the end of three semesters, the eighth graders averaged 79 percent (C+) on the science material that had not been quizzed, compared to 92 percent (A−) on the material that had been quizzed.

Why is that?

Retrieval practice is an act of recalling facts, concepts, or events from memory. It is a more effective learning strategy than rereading. Retrieval practice interrupts forgetting. Recalling information from memory strengthens the neural pathways making it more durable.

One difference between effective and ineffective learners is that effective learners do retrieval practice. What happened? What are some things I did well? What could I have done differently to make it even more effective? Reflecting on how the day went and what I could have done differently helped me learn and do well in future.

Anki is a powerful tool for retrieval practice.

Mix it up

A group of eight year old students practiced tossing bean bags into buckets. Half the group practiced throwing from 3 feet away. The other half mixed it up by throwing from 2 and 4 feet away. After twelve weeks they were all tested on tossing into the bucket that is 3 feet away. Which group performed better?

The kids who performed well were those practicing throwing from varied distance.

Why is that?

Mixing things up make things hard in the short term. The struggle makes your brain to work hard and encode this information in the higher parts of the brain, making it more durable.

When you practice examples from textbooks, don't do the same kind of problems repeatedly. Mix problems up. It will take effort, but that's what happens in real life. Problems don't come labelled. The basic idea of varied practice is like practicing bean bag throwing from different distances. It helps in transfer learning, where you apply concepts learned from one domain into another.

Spaced repetition

Thirty eight surgical residents took four short lessons in microsurgery on how to reattach tiny vessels. Each lesson had some instructions followed by some practice. Half the doctors completed all four lessons in a single day. The other group completed four lessons with a week's interval between them. Which group did well in the test given after one month?

The group that used spaced repetition outperformed the other group in all dimensions.

Why is that?

Embedding new learning in long-term memory requires consolidation, in which memory traces (our brain's representations of the new learning) are strengthened, given meaning, and connected to prior knowledge. This process take several days to finish. Massed practice leans on short term memory, here today gone tomorrow.

Elaboration and Generation

Elaboration is a process of giving new material meaning by expressing it in your own words and connecting it with what you already know.

The act of trying to answer a question or attempting to solve a problem before presented with the information or solution is called as **generation**.

Elaboration:

Your chances of remembering and recalling new knowledge increases when you connect the new information with existing knowledge.

A powerful form of elaboration is to discover a metaphor or visual image for the new material. For example, the principles of angular momentum can be better understood by visualizing how a figure skater's rotation speeds up when her arms are drawn into her body. Similarly, learning about a company by using their products and talking to their customers is more effective than highlighting text in annual reports.

Generation:

In testing, being required to supply an answer rather than selecting from multiple choice options provides better learning benefits.

In one experiment, participants showed better ability to recall pairs of words when they supplied the missing letters. For example, instead of giving foot-shoe you make the participants fill the two missing letters foot-sho__.

The additional effort to generate an answer prepares your mind so that it can cement the solution firmly and make it more durable.

Can you remember this sequence by looking at them only once? 11 95 82 19 62 31 96 64 19 70 51 97 4.

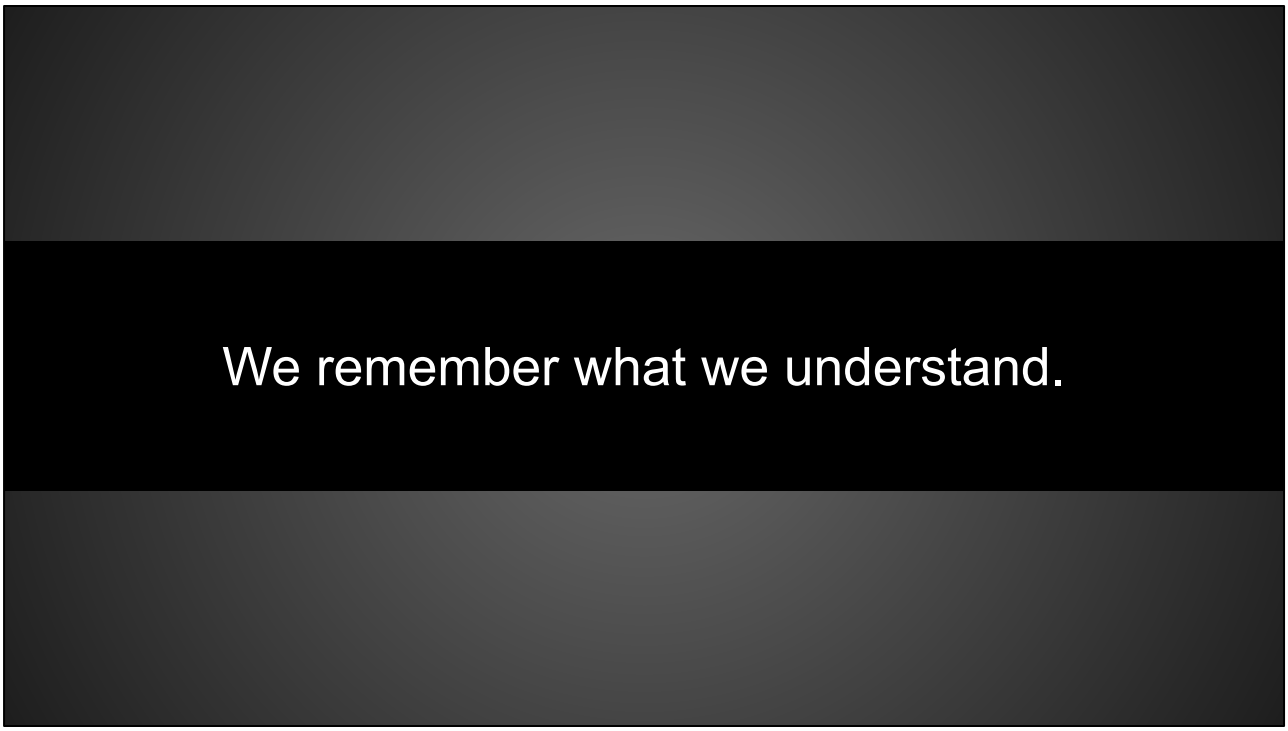
What if I tell you that these are just five years of World Cup soccer numbered consecutively starting from the year 1958?

(1) 1958 (2) 1962 (3) 1966 (4) 1970 (5) 1974

We can hold a maximum of seven things in our working memory plus or minus two.

What I can hold in my working memory is much lower than 5. I tell my friends that I find it hard to manipulate more than 3 variables using my working memory. The trick is to use a pen and paper to overcome this limitation.

The example of remembering numbers randomly versus remembering just the rule of plus four years and 1958 as starting year made it simple.



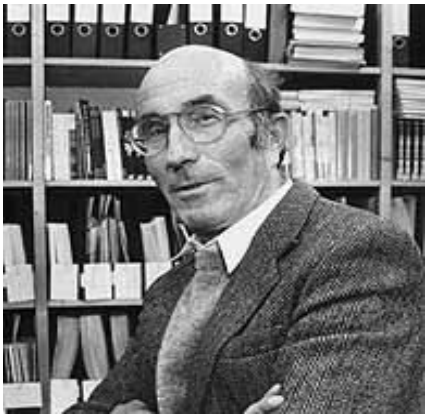
Our brain remembers things when we understand and connect it with what we already know. Things we understand are connected through rules, logic, narratives, mental models, and explanations.

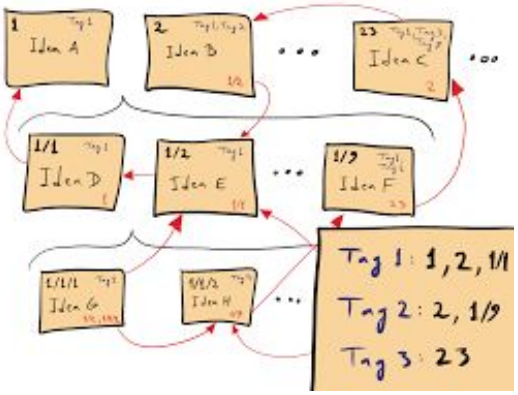
Demo: How I created this presentation?

Explain the process I used to come up with this presentation:

1. Read multiple sources with a pen in hand
2. Literature Notes: Summarizing the book and blogs I read
3. Slip Notes: Permanent notes that will become a part of my mental model. I will go to it again and again for solving problems.
4. Presentation

Niklas Luhmann and his Zettelkasten method

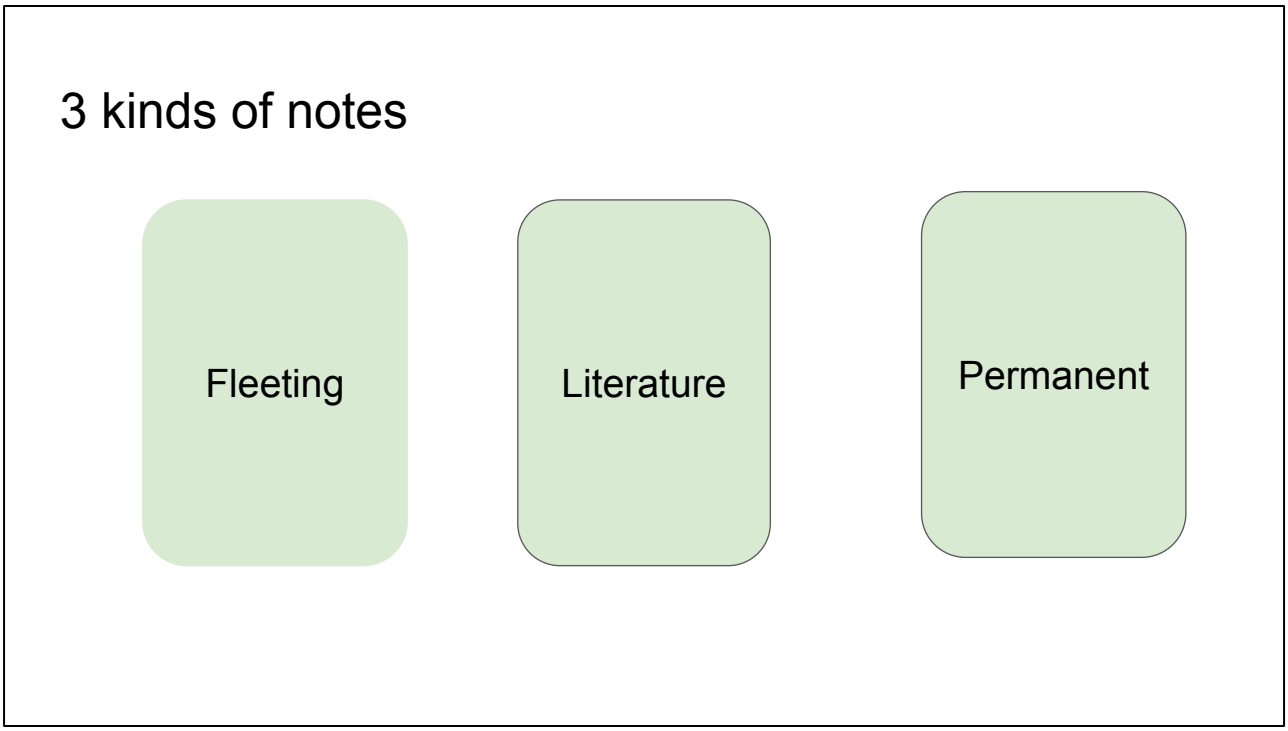




Niklas Luhmann was a German sociologist, philosopher of social science, and a prominent thinker in systems theory, who is considered one of the most important social theorists of the 20th century.

He discovered the idea of writing down key points on pieces of paper and organizing them in a slip box. He wrote 90,000 permanent notes during his lifetime. published over 600 articles and 60+ books on topics including Sociology, Law, Science, Art, Economics, and many more. His high productivity has been attributed to his unique way of working with a slip box.

A zettelkasten is made up of notes containing numbers, tags (blue) and cross-references to other notes (red). A tag index (bottom right) allows topical cross-referencing.

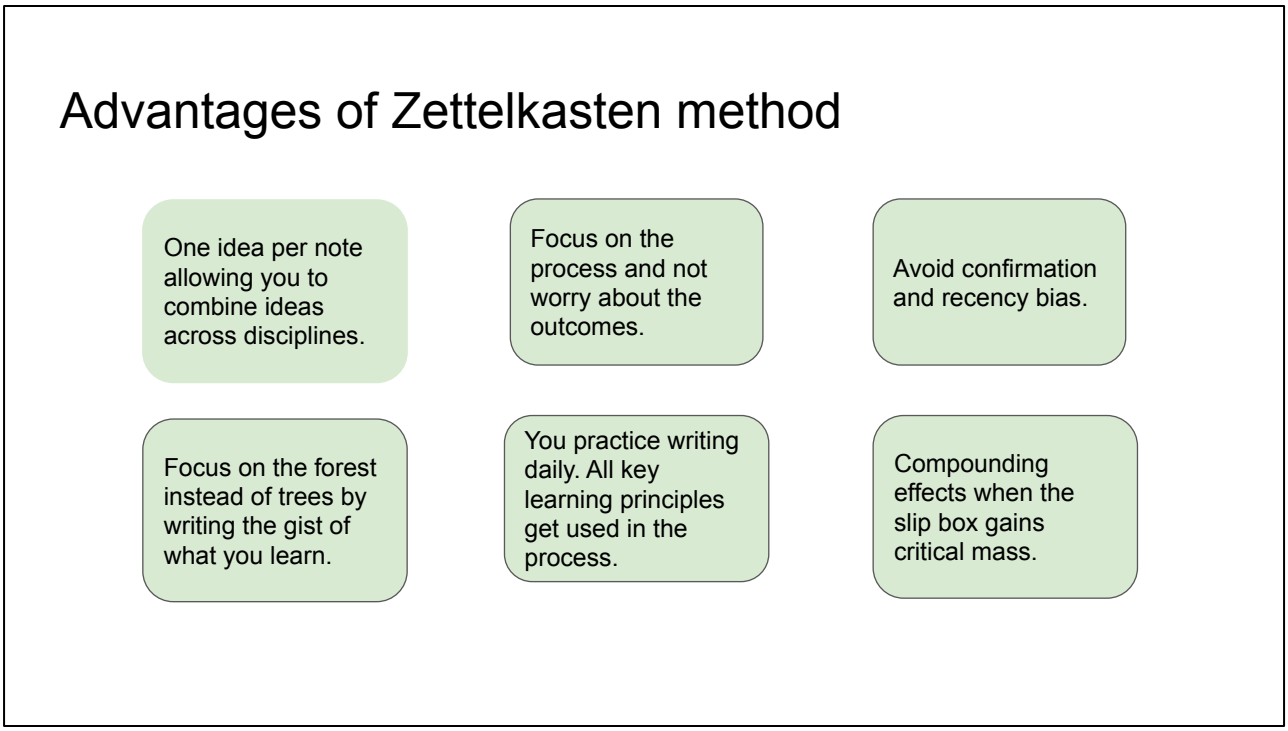


There are 3 kinds of notes:

Fleeting: These are notes we take on the back of napkins or paper based on ideas that pop in our head. Always have a book and pen in hand to capture your thoughts. Process these fleeting notes frequently and see if some of them become permanent notes.

Literature notes: These are notes that we take from books, videos, and other lectures that we attend. Write it in your own words so that you elaborate on them. Don't copy from the book as it's as it won't help in deep understanding. Be mindful of the difference between knowing the name of something and knowing something. Keep them in one place so that you can reference them later.

Permanent notes: These notes go into your slip box (Zettelkasten in German). They are the extensions to your brain. It is not just collecting notes in the slip box. It's for developing new ideas and arguments. How does this piece of information fit with things that I know already? Does it contradict or support my views? What questions are triggered by them?



Advantages of slip box (Zettelkasten in German):

Always limit having one idea per note. Limit the content so that you don't need to scroll to read more. Less is more and this restriction increases our ability to combine notes.

Zettelkasten focuses on the process rather than the outcome. Outcome focus makes us feel failure until the day we hit our goal. On the other hand, process focus makes us feel accomplished on small wins after writing a single note.

Slip box avoids our brain to fall for recency bias. By having all the related information to be seen visually, you increase the chance of being factual and identify the patterns that matter the most.

In the hyperconnected world, it's easy to confirm anything. Algorithms make it even more easier to accentuate confirmation bias. Slip box allows you to collect key insights in a neutral manner. We don't start with what to write, instead the focus is on building a critical mass on the slip box. Human brain resists disconfirming evidence. Your goal is to add relevant facts to the slip box even if it disagrees with your current mental model.

Ideas that are worth adding goes into the slip box. Over time it gains critical mass resulting in compounding effects. It follows the Russian model of focusing on the essential. Russians used pencils for writing in space, instead of coming up with an

expensive pen. Get the gist from what you are reading.

Writing things in our own words forces us to identify gaps in our understanding. It makes us reread and improve our understanding. It provides the feedback loop needed for us to improve.

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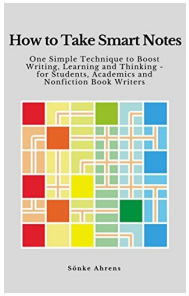
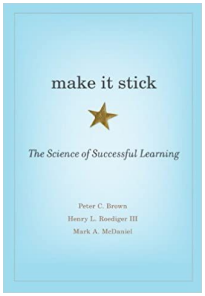
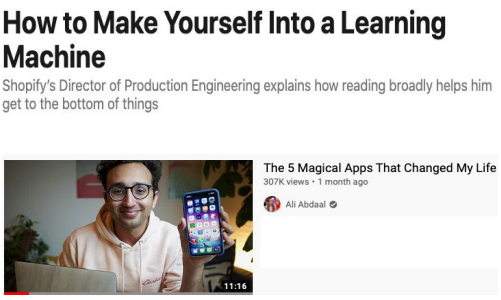
References







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Thank You