

Personal Knowledge Base and Productivity

Architectures and Performance Group's Virtual Retreat

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Oak Ridge National Laboratory
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ORNL is managed by UT-Battelle, LLC for the US Department of Energy



A photograph of a person in a kayak navigating through turbulent, white-water rapids. The water is choppy and brownish-tan. Three vertical poles stand in the background, casting long black shadows on the water. The person is wearing a white helmet and a red jacket, and is actively paddling.

Information
Scarcity

Information
Abundance

Overview

Building a Second Brain

Other Personal Knowledge Base Systems

Note-Taking Tools

My Personal Knowledge Base System

Productivity Tools

Current Topic

Building a Second Brain

Other Personal Knowledge Base Systems

Note-Taking Tools

My Personal Knowledge Base System

Productivity Tools

Building a Second Brain (BASB)

Resources:

- Building a Second Brain Website
- Miro Board
 - Guided Tour of Miro Board
- Illustrated Notes

Concepts:

- Information Scarcity vs. Information Abundance Mindsets
- Resonance as a criteria for what to capture.

	1. Capture	2. Organize	3. Distill	4. Express
Concept	The Reactivity Loop	Organization for Accountability	Compression	Return-on-Attention
Technique	The Capture Toolkit	The PARA Method	Progressive Summarization	Intermediate Packets
Exercise	12 Favorite Problems	Project List	Divergence & Convergence	Just-in-Time Retrieval

Table 1: CODE

Building a Second Brain—Capture



PARA

0. Inbox
1. Projects—Goals with a deadline
2. Areas—Areas of life/responsibility
3. Resources—Topics of themes of ongoing interest
4. Archive—Inactive items from the other 3 categories

Three core principles:

1. Magic Number 4: Four wide and four deep.
2. Mirrors task/project management: Transition between programs.
3. Separates actionable from non-actionable.



PARA

OneDrive

- 0 Inbox
- 1 Projects
- 2 Areas
- 3 Resources
- 4 Archive

OneNote

Notebooks

- ORNL
 - Inbox
 - Journal
 - Notes
 - 1 Projects
 - 2 Areas
 - 3 Resources
 - 4 Archive

JabRef

All entries 272

- All entries 272
- My Papers 12
- ORNL Papers 5
- Topics 211
- Projects 85
- Ungrouped 6
- To Read 20

Progressive Summarization

Concepts:

- Summaries: Passes instead of parts.
- Simple Rule: Summarize a note every time you touch it.
- Wall of text = hard to read.
- Keep Notes Glanceable: Drawing the eye to important parts makes notes easier to remember at a glance and leads to highly discoverable notes.

Layered summarization method:

- Layer 0—Original
- Layer 1—Text/content I bring into the note-taking system.
- Layer 2—**Bold key ideas** and passages.
- Layer 3—Highlighting “Best of the best”
- Layer 4—Summarize Record in my own words the main points.
- Layer 5—Remix Add my own personality and creativity and turn them into something else.
I.e. make something from the notes.

Progressive Summarization

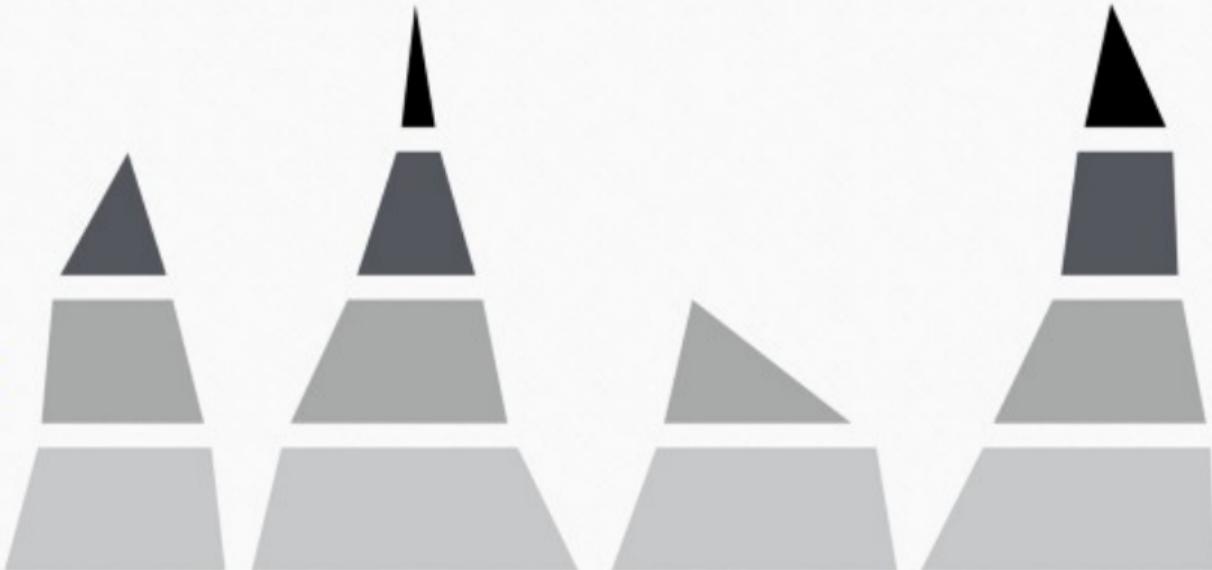
Layer 5: Remix

Layer 4: Mini-summary

Layer 3: Highlighted passages

Layer 2: Bold passages

Layer 1: Notes



Intermediate Packets

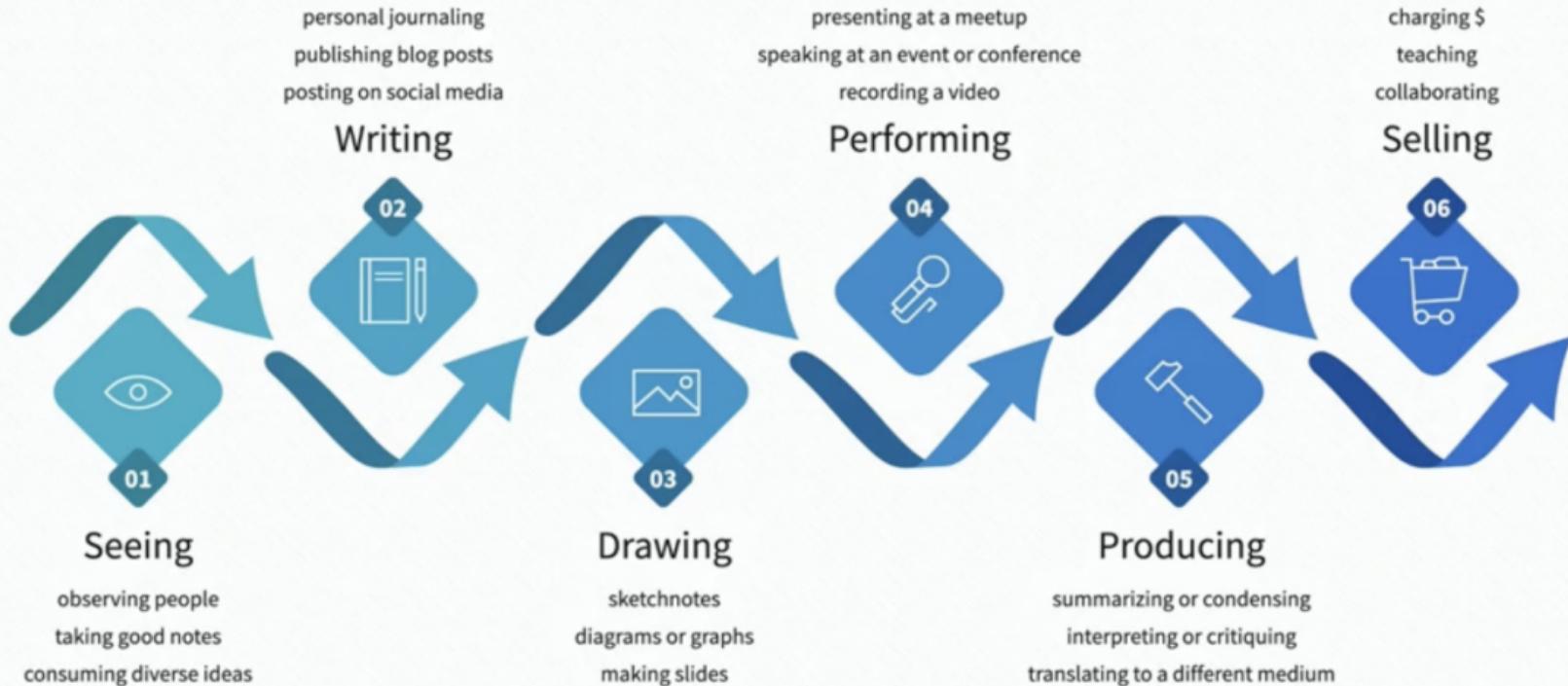
AKA Encapsulate Work

Verum ipsum factum

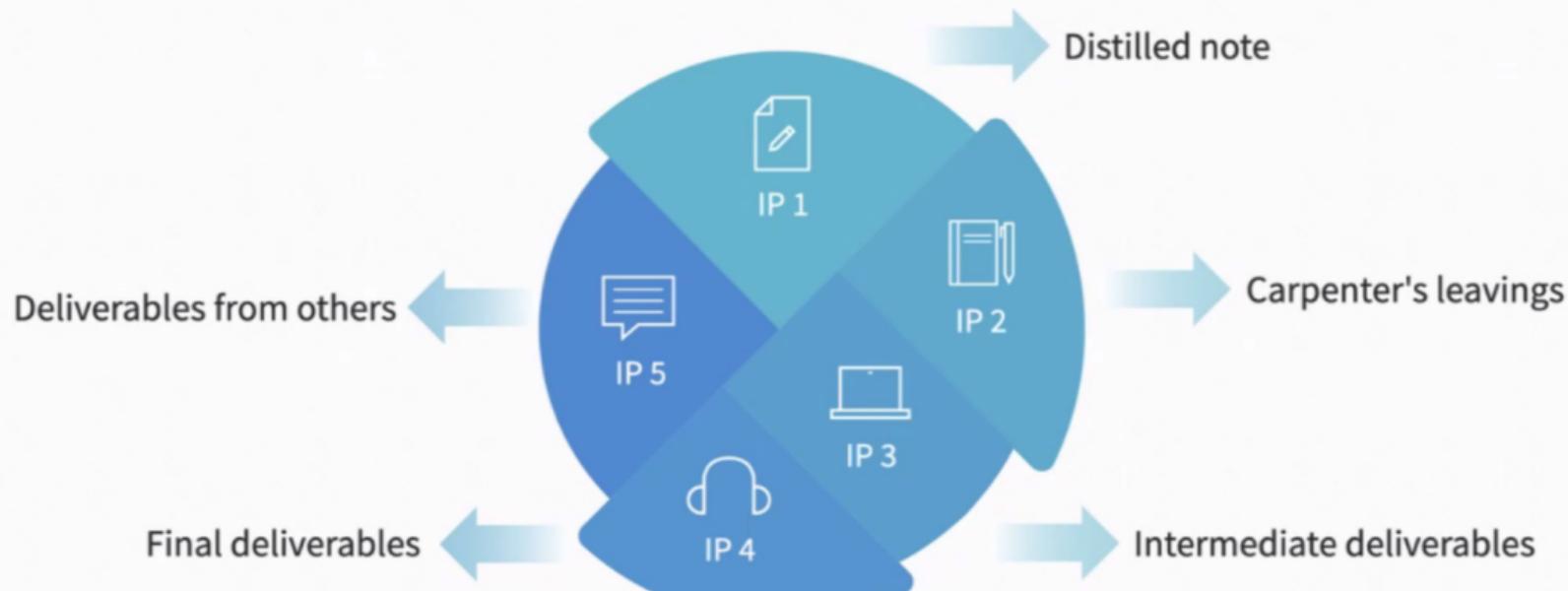
“We *only know what we make*”

Giambattista Vico, philosopher

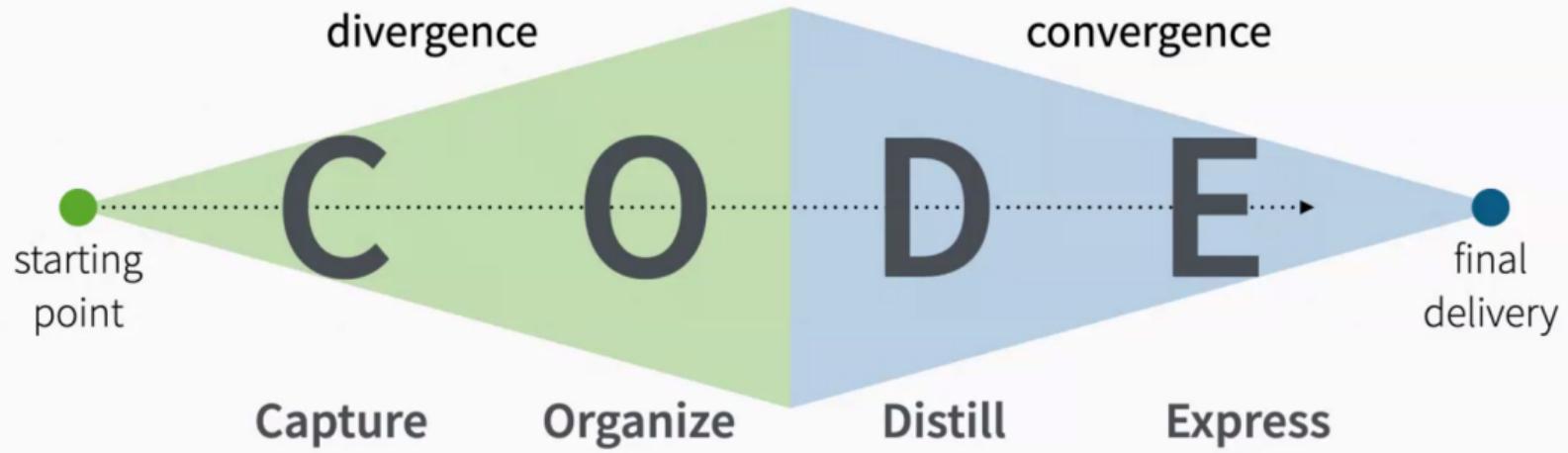
Ways of creating intermediate packets



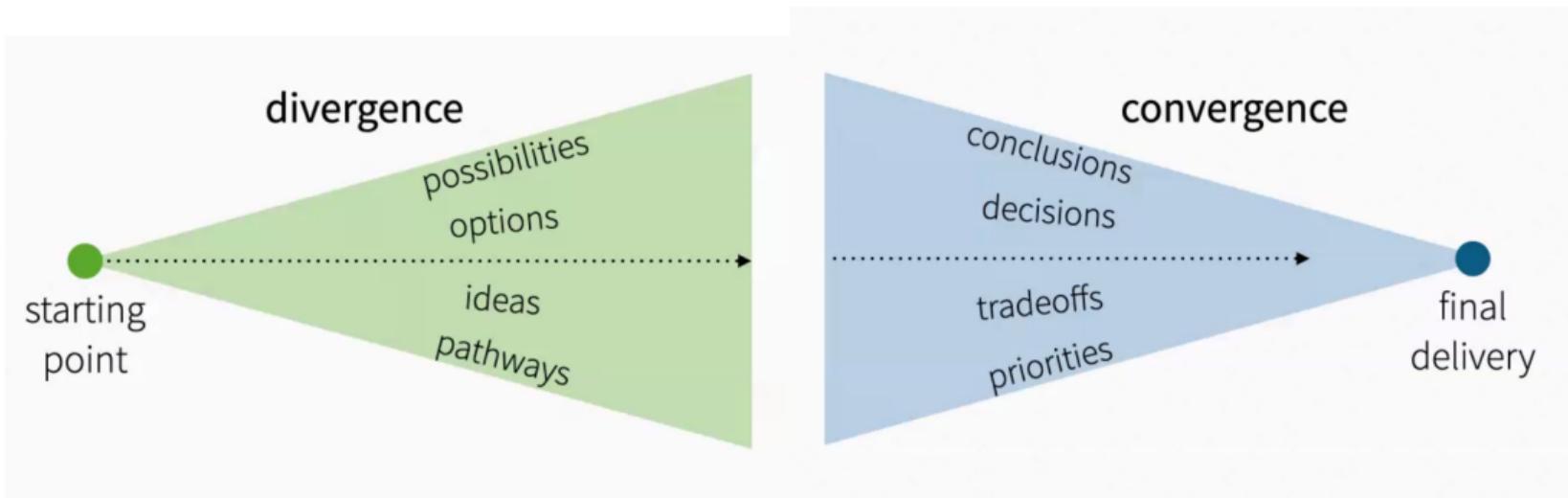
Kinds of Intermediate Packets



Divergence & Convergence



Divergence & Convergence



Just-in-Time Project Management



10+1 Principles for Building a Second Brain

1. **Borrowed Creativity**—Use other people's work
2. **Capture Habit**—Capture information with devices
3. **Idea Recycling**—Use old thinking and reused them multiple times
4. **Projects Over Categories**—Organized based on projects, the tangible things you are working on right now.
5. **Slow Burns**—Not everything has to be hard. Keep things on the back burner, then you have everything you need with little effort.
6. **Start with Abundance**—Gather up stuff then distill it into the work.
7. **Intermediate Packets**—Don't do everything in one go, break everything up into smaller packets.
8. **You Only Know What You Make**—Take action to learn.
9. **Make it Easier for your Future Self**—Package and save things for your future self.
10. **Always Keep Your Ideas Moving**—Many challenges and problems, don't get stuck. Work on multiple things.
11. **Design for the Worst Version of Yourself**—Life will hit hard. Assume you will be tired, lazy, and frazzled. There are more advanced ways to do it. Build the simplest.

Solution to Information Overload¹

1. Write down everything on your mind.
2. Identify the things that are active right now.
3. Choose which ones need to be done today.
4. Do one of them at a time.
5. Complete one thing before moving on to another.
6. Rinse and repeat.

¹These steps are from Tiago Forte, but similar steps are also part of [Getting Things Done \(GTD\)](#).

Current Topic

Building a Second Brain

Other Personal Knowledge Base Systems

Note-Taking Tools

My Personal Knowledge Base System

Productivity Tools

Commonplace Book

“A commonplace book is a central resource or depository for ideas, quotes, anecdotes, observations and information you come across during your life and didactic pursuits. The purpose of the book is to record and organize these gems for later use in your life, in your business, in your writing, speaking or whatever it is that you do.” — Ryan Holiday

Concepts:

- One central location for everything.
- Always available to add too.
- Used to keep from forgetting thoughts and ideas.



BULLET JOURNAL

Watch 4 Minute Tutorial

Concepts:

- Rapid Logging
- Bullets
 - Tasks
 - Events
 - Notes
 - Signifiers
 - Collections
 - Migration
- Collections:
 - Index
 - Future Log
 - Monthly Log
 - Daily Log
 - Custom

Traditional

- Call Keith back about to figure out where we should eat this weekend.
 - Email Heather again regarding the Acme Co release forms for project participants. Need to send out the forms to them and have their signatures before we proceed.
- The Acme Co. UK Presentation is due February 18.
- Email Leigh about her party that she's having on April 21.
- The office will be closed on the 15th.
- I was happily surprised that Margaret seems to have taken her feedback to heart. She volunteered to help manage the assets for the project, and has become a more engaged part of the team. Her work is also showing progress.
- Call to cancel Yoga orientation
 - Order Kim a birthday cake for next week on Thursday. It can be gluten-free because she is allergic.
 - Add hours for Acme co project to the time tracker

Broadway was blocked on my way to work this morning, so I had to take a detour. On the way I spotted a new coffee shop I have to try. It's also a lot more scenic a route. I put the windows down and just enjoyed the ride. I got so caught up in rushing to work, that I totally forgot about this route. By the time I got to work, I was feeling pretty good even though I was a little late.

Rapid Logging*

- 04.01.18
- K: Keith: Call. After-tuesday Dinner
 - A: Acme Co. Release Forms
 - H: Heather: Email. Get forms
 - E: Email forms to participants
 - G: Get signatures
 - A: Acme Co. UK Presentation - Feb 18
 - L: Leigh: Ask Apr 21 Party
 - O: Office Closed Apr 15th
 - M: Margaret: volunteered to help with assets
 - S: Showing more initiative and engagement
 - I: Increased participation efforts

04.01.18

- Yoga: Cancel.
- Kim: get birthday cake
- Celiac: needs to be gluten free
- The party on Thursday
- Acme Co.: Log hours
- Broadway blocked, had to take long way
 - Try new coffee place
 - Much prettier drive
 - Felt more relaxed when I arrived

* 60% less content!

Zettelkästen (Luhmann's Slip-Box)

Concepts:

- Unique Identifier for each note
- Connectivity between ideas
- Repository of knowledge for thinking and writing
- Atomicity of ideas
- Extendable in any direction

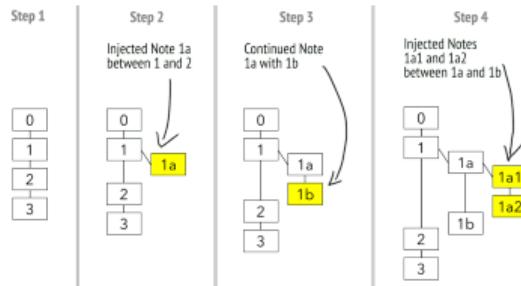


Figure 1: Luhmann's numbering system allowed to make sequences and intersperse notes between adjacent notes through adding another character to the end.

References:

- Getting Started
- Introduction to Zettelkasten
- In-depth Presentation
- *How to Take Smart Notes*¹ Book Summary

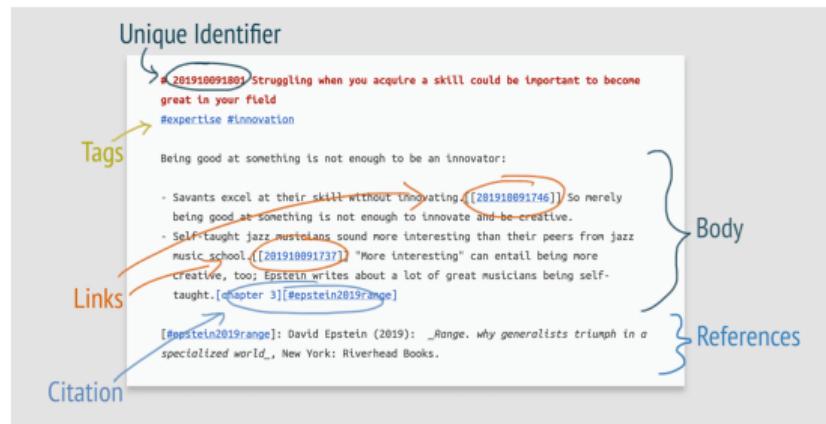


Figure 2: All the parts of a Zettel together.

Current Topic

Building a Second Brain

Other Personal Knowledge Base Systems

Note-Taking Tools

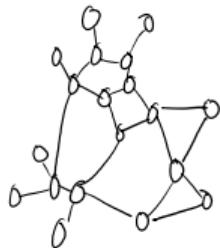
My Personal Knowledge Base System

Productivity Tools

Note-Taking Method Comparisons

Knowledge Network vs. Knowledge Hierarchies

Web of Links



Decentralized Network
(Zettelkasten)

Index of Book



Hierachical Tree

Note-Taking Method Comparisons

Search



vs.

Locate



Note-Taking Method Comparisons

One Note per Source

vs.

One Note per Idea

Note-Taking Method Comparisons

Fluid

vs.

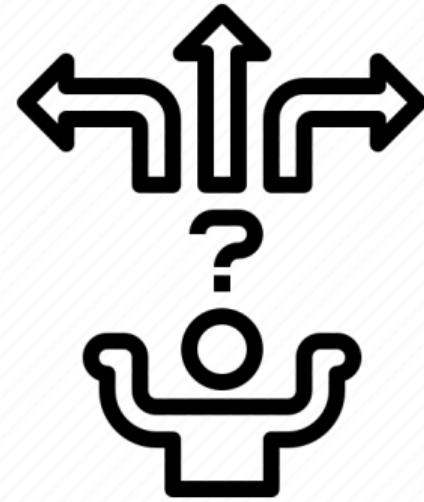
Structure



Considerations for selecting a note-taking program

Features:

1. Easy capture of any information
2. Powerful search
3. Availability on multiple devices
4. Backup
5. Secure sensitive notes
6. Default structure of note organization
7. Easy hyperlinking to anywhere
8. Flexibility to reorganize/change structure
9. Program lock-in
10. Ease of using external programs



Note-Taking Programs

1. [OneNote](#)—Part of Microsoft Office.
2. [VimWiki](#)—Personal wiki extension to Vim.
 - 2.1 [Vim-Zettel](#)—Zettelkästen method using Vimwiki.
3. [Evernote](#)—Web Based “The Original” note-taking app.
4. [Foam](#)—Extension to VSCode. Uses Markdown.
5. [Notion](#)—New option, Collaborative, Web Based, Build Workflows.
6. [Roam](#)—Networked Note-Taking. Graph Database.
7. [Obsidian](#)—Second brain. Uses Markdown. Cool Graph View.
8. [Zettlr](#)—Zettelkästen using Markdown.
9. [OnePoint Electric Lab Notebook](#)—ORNL. Combination of OneNote and SharePoint.
10. [Joplin](#)—Open-source, uses Markdown.
11. Paper Lab Notebook—Good old-fashioned method.



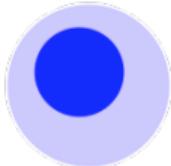
OnePoint
Electronic Lab Notebook



Evernote



A Personal Wiki For Vim



Current Topic

Building a Second Brain

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Productivity Tools

My Personal Knowledge Base Story

- Weekly task sheet, folder with clipboard
- Engineering Notebooks
- Bullet Journal/Commonplace Book
- Vimwiki Research Database
- Restructured Vimwiki as Zettelkästen
- Rocketbook and Evernote
- Onenote and PARA

Bullet Journals



Engineering Notebooks

Laboratory Binders



Original Custom Folder Rocketbook Vimwiki

Currently I use Onenote, PARA, and Bullet Journal.

Demo My Personal Knowledge Base

The screenshot shows the Microsoft OneNote application interface. The ribbon menu is open at the top, displaying various tabs like File, Home, Insert, History, Review, View, and Help. Below the ribbon, the main workspace is titled "Home". The left sidebar, titled "Notebooks", lists several sections: ORNL (selected), Inbox, Journal, Notes, 1 Projects (with "Return to Campus" and "Abisko" sub-sections), 2 Areas (with "General Updates", "General Meetings", "Seminars", "Workshops", "Conferences", "EPM", "Supervisor 1-1", "Travel", "Interviewing", "Funding (FDA)", "SOP", "Performance Reviews", "Architectures and Performance", "ExCL", "Intel", "Xilinx", "Resources", and "Archive"), and 3 Resources (with "General Notes", "Tutorials", "Papers", and "Emails"). The central content area displays a hierarchical list of topics under "Home":

- Journal**
 - Weekly Updates
- Projects**
 - Codesign White Paper
 - X-Stack White Paper
 - HICCU
 - o <https://code.ornl.gov/7cy/hiccup>
 - ExCL
 - Ranger
 - Xilinx
 - Micron
 - C3
- Areas**
 - Architectures and Performance
 - ExCL
 - General Meetings
 - Seminars and Webinars
 - Conferences
 - EPM
 - Supervisor 1-1
 - Travel
 - Interviewing
 - Things I use but can't remember
- Resources**
 - General Notes
 - Tutorials
 - Papers
 - Emails

Current Topic

Building a Second Brain

Other Personal Knowledge Base Systems

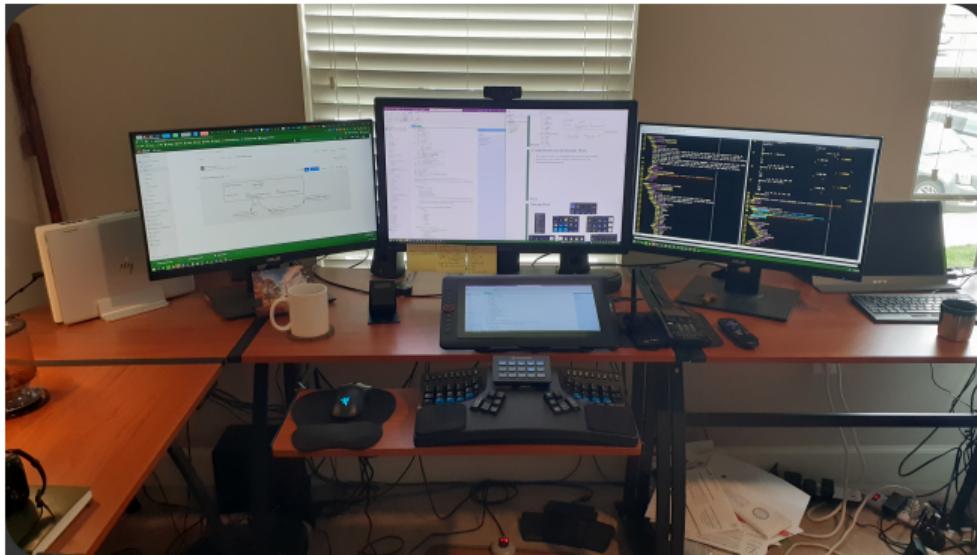
Note-Taking Tools

My Personal Knowledge Base System

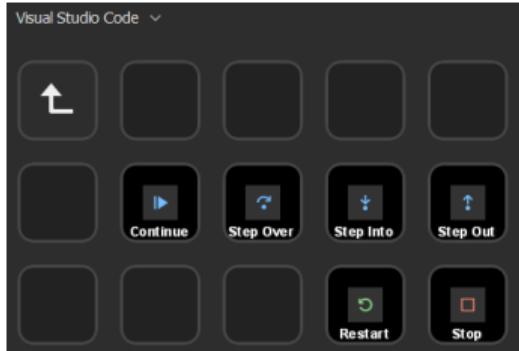
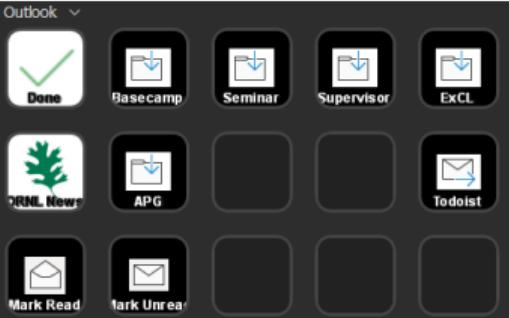
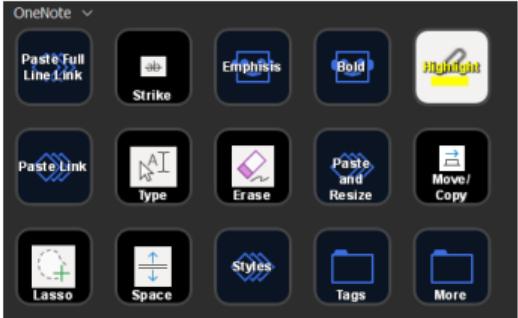
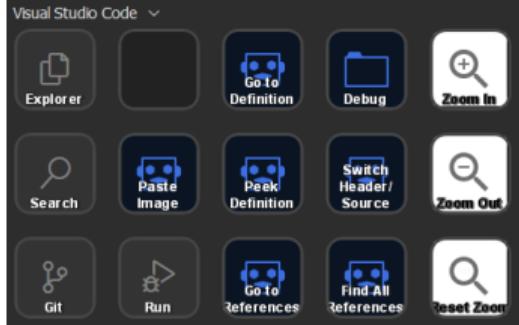
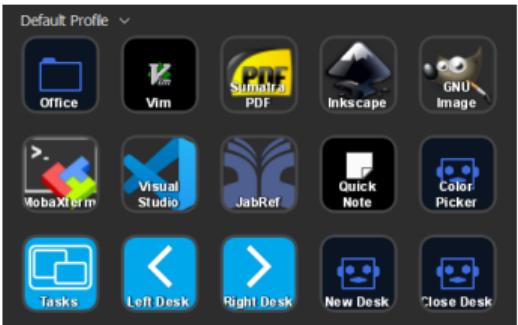
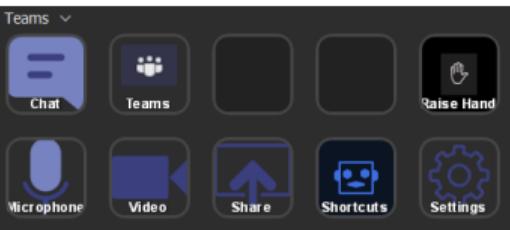
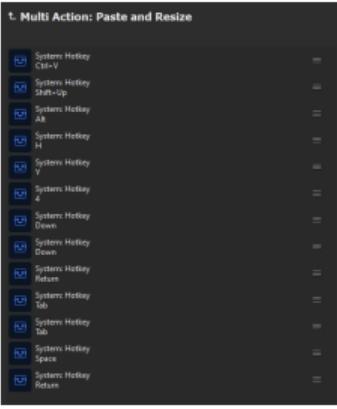
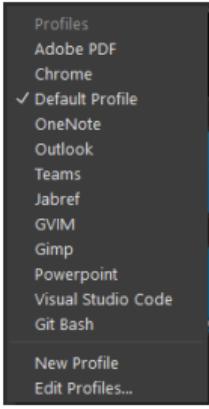
Productivity Tools

Useful Hardware for Remote Work

1. Pen Display or Tablet—For digital handwritten notes and white boarding.
2. [Stream Deck](#)—Easy creation of macros or shortcuts for any app.
3. Docking Station and peripherals.



Stream Deck



JabRef

Bibliography manager which uses BibLaTeX files as the database.



Screenshot of the JabRef application interface showing a bibliography database.

The left sidebar displays a tree view of groups and a search bar. The main area shows a table of entries with columns: Groups, Enttype, Author/Editor, Title, Comment, and Year. A detailed view of an entry for "Flexible communication avoiding matrix multiplication on FPGA with high-level synthesis" is shown at the bottom.

Groups	Enttype	Author/Editor	Title	Comment	Year
All entries	Misc	Geric et al.	Gemmini: An Agile Systolic Array Generator Enabling Systematic Evaluation		2019
My Papers	InProceedings	Reuther et al.	Survey and Benchmarking of Machine Learning Accelerators	2019 Survey Paper, Pointed out by Jeff.	2019
ORNLI Papers	InProceedings	Andri et al.	Extending the RISC-V ISA for Efficient RNN-based 5G Radio Resource Management	Published at DAC 2020. It has all the buzzwords: risc-v, ML, R...	2020
Topics	InProceedings	Aari et al.	Simulator calibration for accelerator-rich architecture studies	Paper by Gerstlauer on simulators. Mentioned at co-design w...	2016
Projects	InProceedings	Rogers et al.	gem5-SALAM: A System Architecture for LLVM-based Accelerator Modeling	Uses LLVM to specify accelerators in GEMS.	2020
Adrastea	InProceedings	Kao et al.	Confucius: Autonomous Hardware Resource Assignment for DNN Acceleration	Optimize PE and Buffer selection per layer in DNN using 2 sta...	2020
RANGER Bibliography Items	InProceedings	Nigam et al.	Predictable Accelerator Design with Time-Sensitive Affine Types	Dahlia: type checking language which can generate Xilinx HDL...	2020
Rodinia FPGA Project	InProceedings	Hie et al.	Newton: A DRAM-maker's Accelerator-in-Memory (AIM) Architecture for ...		2020
ML4CS	Article	Brahmakshatriya...	Taming the Zoo: The Unified Graphit Compiler Framework for Novel Arch...		
X-Stack Idea	InProceedings	de Fine Lich...	Flexible communication avoiding matrix multiplication on FPGA with high...	Paper related to spcl/gemm_hls	2020
Codegen Whitepaper	InProceedings	Lin et al.	Random Forest Architectures on FPGAs for Multiple Applications	Random Forest for FPGAs for multiple applications. Compares...	2017
Architecture Reading Group	InProceedings	Van Essen et al.	Accelerating a Random Forest Classifier: Multi-Core, GP-GPU, or FPGA?	LLNL Random Forest FPGA and GPU implementations. Uses C...	2012
HICUP	InProceedings	Struharik	Implementing decision trees in hardware	Several Architectures for DT in Hardware (axis-parallel, obliqu...	2011
Uncategorized	InProceedings	Nakahara et al.	A Random Forest Using a Multi-valued Decision Diagram on an FPGA	Multi-Valued Decision Diagram instead of Binary Decision Tre...	2017
To Read	Article	Jingui et al.	An FPGA realization of a random forest with k-means clustering using a h...	korange tool flow. Uses k-means clustering to share comparato...	2018

Bottom details for the selected entry:

InProceedings

Required fields: Author, Booktitle, Date, Title, Citationkey.

Optional fields: de Fine Licht, Grzegorz and Hoefer, Torsten.

Booktitle: Proceedings of the 2020 ACM/SIGDA International Symposium on Field-Programmable Gate Arrays

Date: 2020

Title: Flexible communication avoiding matrix multiplication on FPGA with high-level synthesis

Citationkey: de2020flexible

Abstract: J. de Fine Licht, G. Kwasniowski, and T. Hoefer, "Flexible communication avoiding matrix multiplication on FPGA with high-level synthesis," in *Proceedings of the 2020 ACM/SIGDA International Symposium on Field-Programmable Gate Arrays*, 2020, pp. 244–254.

Slack

Tips:

1. Organize your channels.
2. Most conversations (80%) should be placed in the channel that the conversation relates to. That why it is easier to find a conversation related to the topic. So for instance, if you have a question relating to a project, post the question in the project channel with an @ instead of sending a private message to the person.
3. Use threads to keep related messages/responses together. (I found using threads plus the "also send to channel" useful, since it is shown in the main chat but also has the correct history.)
4. An "emoji-pedia" could be useful to create a common consensus on the meaning of different emojis.

The screenshot shows the left sidebar of a Slack application. It includes sections for 'Projects' (with channels abisko, adrastea, hiccup), 'ExCL' (with channels excl, excl-fpga, excl-gpu), 'Connections' (with a list of users: Anthony Cabrera, Frank Liu, Jacob Lambert, Katie Schuman), and 'Starred' (with a list of users: ccsd-acsr-apg, Anthony Cabrera, Frank Liu, Jacob Lambert, Katie Schuman). A double-headed arrow icon is located at the top right of the sidebar.

- ▼ Projects
 - abisko
 - adrastea
 - hiccup
- ◀
- ▼ ExCL
 - # excl
 - # excl-fpga
 - # excl-gpu
- Connections
 - Anthony Cabrera
 - Frank Liu
 - Jacob Lambert
 - Katie Schuman
- ▼ Starred
 - # ccsd-acsr-apg
 - Anthony Cabrera
 - Frank Liu
 - Jacob Lambert
 - Katie Schuman

Project Management in GitLab

Guidance:

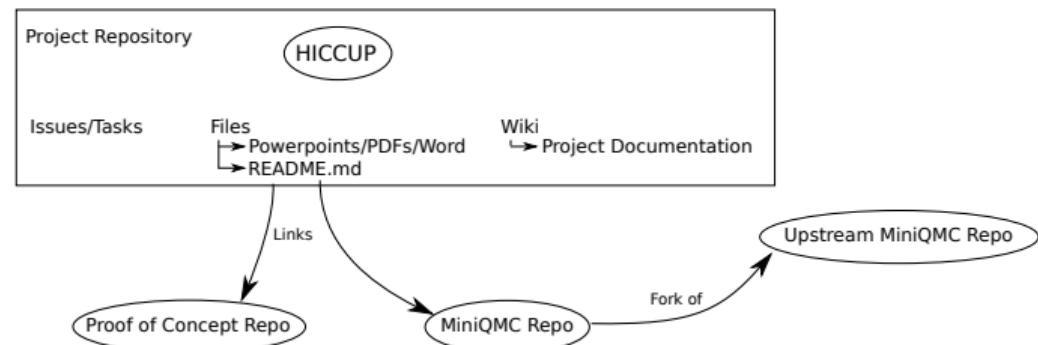
1. Use files to store shared files and artifacts from the project.
2. Use submodules to link to code repositories and Overleaf documents.
3. Use issues to track ideas/objectives/tasks.

3.1 Recommended Labels:

- 3.1.1 (Open)
- 3.1.2 (Closed)
- 3.1.3 Bug
- 3.1.4 Discussion
- 3.1.5 Doing
- 3.1.6 Feature
- 3.1.7 Ideas
- 3.1.8 Todo

3.2 Recommended Boards:

- 3.2.1 (Open)
- 3.2.2 Ideas
- 3.2.3 Todo
- 3.2.4 Doing
- 3.2.5 (Closed)



Weekly Review

Guide to doing a weekly review

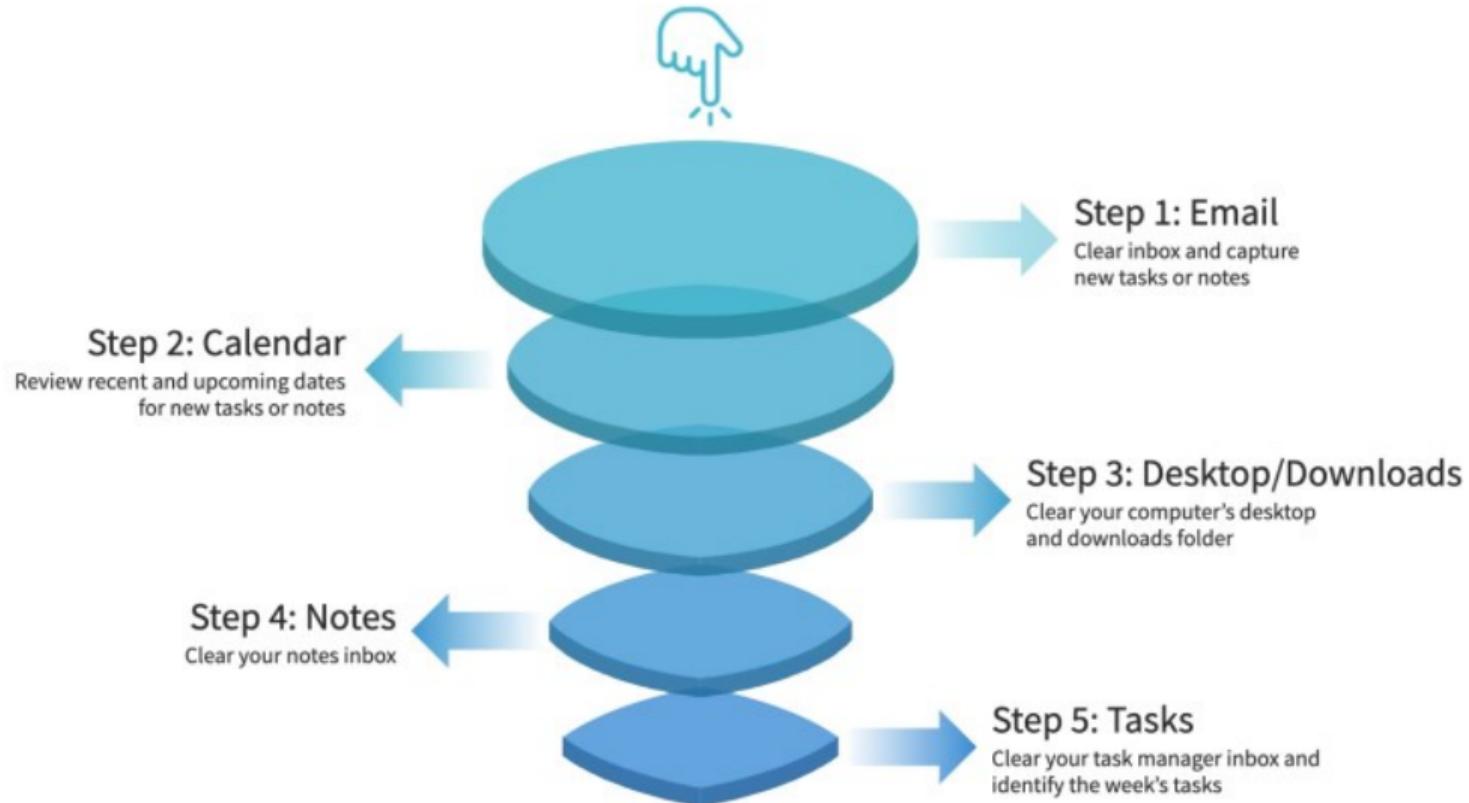
Like keeping a budget in finance, weekly review should be quick maintenance.

3 Things to accomplish with Weekly Review:

1. **Clear your digital workspaces:** Tidy up the virtual environment where you get things done.
2. **Update your available tasks:** Update your to do's based on new information that's come in.
3. **Decide on your priorities for the week:** Select a subset of to do's that you are actively committing to for this week.

BONUS: Send a progress report to your supervisor.

The One-Touch Guide to Doing a Weekly Review



The One-Touch Inbox Zero Workflow

Tiago Forte | fortelabs.co



Weekly Review

Each location is an inbox for external information:

1. **Email:** Emails from other people
2. **Calendar:** Calls and meetings at specific times
3. **Desktop/Downloads:** Files and downloads
4. **Notes:** Digital notes I've saved
5. **Tasks:** My todo's

For each task, then decide:

1. **What is the next action:** Make the task as clear as possible
2. **What priority it is:** Apply a tag for High or Medium priority. (Low priority doesn't get a tag.)
3. **What project or area it falls into:** Move it into the most actionable project or area of responsibility.

High priority is reserved for things that must be done this week.

Decide what I *can* take action on, what I *need* to take action on, and what I *want* to take action on.

Task Tracking

- Use a todo tracking app like [Todoist](#).
 - Great for small quick tasks. More Structure.
 - Integrates with Outlook/Google Calendar.
 - Can automatically add tasks from Gitlab.
- Keep a todo list in your Personal Knowledge Base.
 - Great for larger tasks / more flexibility.
 - Manual nature forces periodic review.
- Track todos using project management tools like Gitlab or Basecamp.
 - Already need to do for collaborative tasks.

My method is to use the bottom of my OneNote journal page and hyperlink to tasks in project management tools.



Time Tracking

- Use a time tracking app like [Toggl Track](#).
- Integrates into GitLab, Trello, Todoist, and more.
- Projects and clients can be specified to generate weekly reports.



Personal Knowledge Base and Productivity

Architectures and Performance Group's Virtual Retreat

Aaron Young
Oak Ridge National Laboratory
October 28, 2021

ORNL is managed by UT-Battelle, LLC for the US Department of Energy



My Personal Knowledge Base Story

Bullet Journals

Engineering Notebooks

Laboratory Binders



Original Custom Folder

Rocketbook

Vimwiki

How to Take Smart Notes I

10 Principles for Taking Smart Notes

1. Writing is not the result of thinking; it is where the thinking takes place.
 - Thinking requires elaboration—we need to copy, translate, rewrite, compare, contrast, and describe the new idea into our own terms.
2. Do your work as if writing is your only goal. Things not written down and shared are lost.
 - Ideas kept private or as good as one you never had.
 - What the author meant doesn't matter, only what is on the page.
3. Nobody ever starts from scratch.
 - Research is conducted before a topic is just picked. No idea is grabbed from thin air.
 - Take notes as you research, otherwise you have to start something completely new (which is risky) or you have to retrace your steps (which is boring).
4. Our tools and techniques are only as valuable as the workflow.
 - Workflow is to collect organize, and share ideas.
 - The components and tasks must fit together for the whole.
 - An undistracted brain and a reliable pile of notes is all that is required.

How to Take Smart Notes II

5. Standardization enables creativity.

- Use notes as the standard container for ideas.
- Notes → outline → rough draft → polished draft
- Each step requires a different focus and slip-box contains the process.
- One place, one format. Treat each note the same.
- No part of the writing step is particularly hard. We just try to combined and skip steps which makes it difficult. Do one step at a time to make it easier.

6. Work only gets better when exposed to good high-quality feedback.

- Notes are a type of feedback, in addition to feedback from other people.
- Set reasonable tasks and see if you accomplished it.

7. Work on multiple, simultaneous projects. Unrelated information from one project could help with another project.

How to Take Smart Notes III

8. Organize your notes by context, not by topic.

- Organize notes into the context in which they will be used. Put the note where it will be used and don't be afraid to put it in multiple places
- This will help you find the note when you want it. A note is only good if you can find it again when you want to use it.
- Difference between librarian and writer.
- Writers don't think about single correct location. They deal with 'scraps' of information which can be repurposed and reused elsewhere.
- Save byproducts of writing for future work.

9. Always follow the most interesting path.

- It is essential to make our work sustainable and successful. Adjust the plan as more information is obtained.
- "When even highly intelligent students fail in their studies, it's most often because they cease to see the meaning in what they were supposed to learn (cf. Balduf 2009), are unable to make a connection to their personal goals (Glynn et al. 2009) or lack the ability to control their own studies autonomously and on their own terms (Reeve and Jan 2006; Reeve 2009)."
- This is different than what most people are taught. They are taught to make a plan and follow it through, not adjust the path as the path is walked along.

How to Take Smart Notes IV

10. Save contradictory ideas

- They lead to arguments and discussions.
- Notes should add to the discussion.

Don't just feel smarter. Become smarter

- Notice gaps in understanding.
- Don't feel smarter become smarted by filling in the gaps.
- Students aren't taught how to make these large interconnected networks of information.

Ultimately, learning should not be about hoarding stockpiles of knowledge like gold coins. It is about becoming a different kind of person with a different way of thinking. The beauty of this approach is that we co-evolve with our slip-boxes: We build the same connections in our heads as we deliberately develop them in our slip-box. Writing then is best seen not only as a tool for thinking but as a tool for personal growth.

Bibliography I

- [1] Sönke Ahrens. *How to Take Smart Notes: One Simple Technique to Boost Writing, Learning and Thinking—for Students, Academics and Nonfiction Book Writers.* Sönke Ahrens, 2017.