Qeios

Research Article

What is zettelkasten and how to write "papers" using zettelkasten?

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Zettelkasten is a system of maintaining interlinked notes in a repository and developing themes and knowledge artifacts from such interconnected notes that have identity codes, and connectors. We will describe here how to set up a Zettelkasten method of knowledge base for your own purpose and use such a system to rapidly develop reviews and publish knowledge artifacts from such collections. Essentially, these are the steps to follow: first, set up a Zettelkasten (slip-file) system for the research papers and research data you want to work with; next, use the zettels (or notes or slips) to identify clusters and patterns, and the final step is to write research documents using information contained in the "slips".
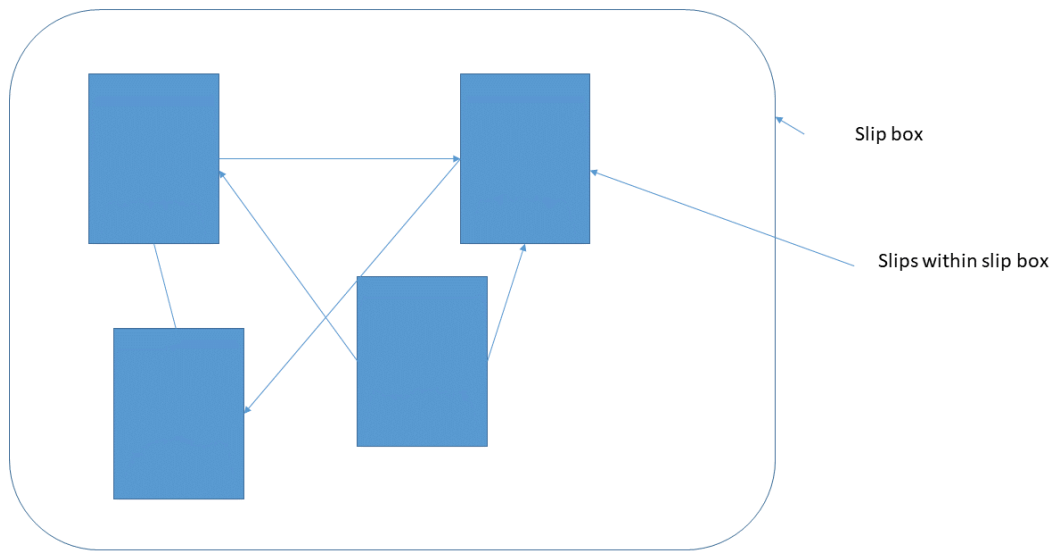
What is the zettelkasten system?

Figure 1. Zettelkasten system or slip box system of interconnected notes. The larger box is the slip box and individual slips are inserted within the box. All slips are interconnected

Zettelkasten is a system of filing (slip-file), where slips of paper are stored in a file drawer system. This was popularised by the sociologist scholar Niklas Luhmann in Germany who was credited to have written over 70 books and 400 papers using this system over a 40 year career (cite). This system has three components:

- The slip file itself (zettelkasten) contains the slips referred to as zettels
- zettels themselves, each zettel is identified by its unique identity code, a number of backlinks to other zettels called "connectors", one or more "tags" or descriptors of the information contained within it, actual information in plain text or other formats, and a set of references from where information on the zettel links
- An index zettel that lists key zettels (usually three or four zettels) that serve as entry points to the topic

This system works like a network of neurons mimicking the human brain and neuronal connections: this is why it is also referred to as "second brain".

Setting up a zettelkasten system

There are three features of the zettelkasten (abbreviated as zk system) that are noteworthy:

1. Individual files or notecards are structured such that each is connected with each other and has information on the source of information

2. An overall structure to hold the cards together

3. An index system that will let the user to search and thus connect to each cards.

In other words, any source of information can be "exploded" to a number of cards that then will have five elements:
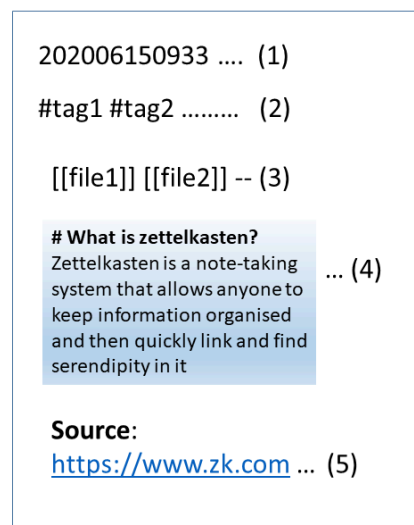

Figure 2. Structure of a zettel. 1. ID; 2. tags; 3. backlinks to other zettels in the file drawer; 4. Actual content written in markdown format; 5. Link to a source

1. An identity code usually in the form of yyyymmddhh as you can see here, the ID is set as 202006150933 and indicates the timestamp when this document was created. The identity code uniquely identifies the zettel in the system and is used for backlinks.

2. A set of tags, the tags identify the theme to which the zettel or the note belongs.

3. A set of backlinks to other zettels. the backlinks connect the zettels or notes with each other and is the backbone of the system so that the neuron like structures can be replicated.

4. A set of source information. As each note is obtained from a source document, the exact source from which it came from needs to be documented, otherwise the note cannot be used in future to generate new insights.

5. Main content written in markdown. This is written in markdown format as simple plain text format in digital contexts. If you want to use paper and pencil notecards, then you can write in freehand, up to you.

Zettels with bibliography

When you create this system, most people will use a bibliographic or reference management system to manage their references. These reference management systems such as Zotero provides add-on such as Zotfile that can be used to manage the file attachments such as pdf, etc. Now, if you write notes on the pdf and highlight passages, these can be pulled in to Zotero (for instance, but you can have other reference management systems that you want to use). These are not finalised zettels (let's call zettels as "z"), as each zettel must be a simple single idea that stands alone. Hence the bibliographic notes are best kept separate and then you process them separately so that new zs are created from the large bibliography manager based document.

Zettels with notes (fleeting notes)

In addition to the reference notes, you can also create what is referred to as fleeting notes. For detailed discussion on fleeting notes, see the website and accompanying text by Sonke Ahrens and how to take smart notes blog by Tiago Forte. Essentially a fleeting note is one that you jot down and will process later. These are not meant for entry into the zk system. The following kind of notes are fleeting notes:

1. Notes that are your ideas or instant ideas that you jot down

2. Fleeting thoughts

3. Scribbles on reading a book or paper

4. Marks that you make on the bibliographic software notes

5. Reference notes

After you have developed your stash of zettels or notes this way, add an index zettel or index note. This index note is structured in the same way as the other zettels in the system, except that this index note will contain backlinks to one or more notes that can explain the topic of interest. This way, an index

note connects important other notes and all notes are now interconnected to make up a large note system which is complex and continues to grow.

Then, when you are ready to revise, you can search on the tags, and combine the notes to identify clusters and develop patterns to write the paper. You can also use this system to study. In that case, use the following strategy:

Step 1. Read the bunch of papers or books and combinations of papers and books and when you do so, rather than marking them with highlighters, or highlighting passages, actually write the contents or thoughts to a paper based system. This is useful because it helps you to keep focus on the article or book you are studying as opposed to stop and start for capturing ideas on digital tools. Note that at this stage, you are either skimming or reading lightly to capture the main ideas in the book.

Step 2. Once the first pass is completed, get back to the book for more focused reading and write short snippets explaining the difficult concept to yourself. Use the <u>Feynman technique</u> to write down the details with three elements:

- Use a simple language explanation
- Use illustrations and diagrams
- Use analogies and examples.

Step 3. This will create your reference notes. These reference notes are still on paper. You can digitise and convert them into a larger document though. But this time, go back to your longer document with a deeper understanding of the process and create shorter single idea zettels out of the longer document. This is the bridge between studying something and creating zettels that will come handy later.

Most zettelkasten software provide features where you can view the tags and tag based network analysis to identify patterns that help in the emergence of new ideas. These are also useful for concept mapping and further mind mapping to generate new concepts and insights.

Software tools to enable this process

If you want to go analog, you can use a set of boxes and notecards to build this system.

If you want to go digital, then there are several choices.

One way is to use plain text files, the file manager of the operating system and a system of regular expressions where you can use tags to search and filter notes which you can then combine.

Another way, might be to use dedicated software. For instance, underline obsidian and underline zettlr are free and open source software tools to work with this system.

Yet another way might be to use the Emacs based org-mode and use other tools within that ecosystem to develop the zettelkasten system.

Regardless, these are the basic principles:

1. Start with a source document or more than one source documents
2. Explode the source documents to create atomic zettels or atomic or single idea based notes which can be interconnected using strong (direct linking) or weak links (using tags)
3. Keep all zettels in a single folder or a single box. This is an important aspect of the process, so that your information units are not fragmented.
4. Search the zettels, retrieve and mix them in various combinations to work with them to generate new ideas.

Summary and conclusions

In summary, zettelkasten is a system of stash of notes. These notes are separated from their source documents and are stand alone notes. This way these notes are both stable and mobile. These notes are stable because they can be linked to the source document and can be used to write paragraphs or develop ideas with source attribution. These notes are mobile because by using the system of tags these notes can be linked with one another and together they make up a complex structure of interconnected notes or knowledge bits. Their simultaneous connection and stand-alone stability and possibility of permutations and combinations is useful to develop rich tapestry of knowledge.

Declarations