

Five Design-Sheets

Sheet 1- **Brainstorm**



Introduction

The idea of brainstorming is to enlarge the design space of possibilities. There should be a focus on quantity - to generate all the possible designs. This may, or may not, be a group activity. Brainstorming on one's own can be likewise rewarding. Also, software can be used to help in the process (such as the use of mind-map software can help users order their thoughts and ideas around a topic). But in this work, we advocate sketching as the principal design tool.

Panels

There are five stages (panels) in this task:

1. **Generate Ideas.** Sketch and draw as many ideas as you can think of. In reality these are mini ideas. They are short concepts that could be part of a whole. E.g. use a scatter plot, or line graph, or need some Dynamic query task to filter the results. These may be comprehensive and complete ideas, or half-baked ideas, simple concepts, or merely wacky suggestions.
2. **Filter the ideas.** Take the ideas and start to remove any duplication. Remove any ideas that seem too like another idea.
3. **Categorize the sketches.** Start to order and categorize the sketches, the mini-ideas. Concepts that are similar should be located together. If you are using sticky-notes then these can be easily moved and categorized on a wall, for instance. There may be different and alternative categorizations; just choose one

and move on. The categorization and the ideas will probably change and develop anyhow.

4. **Combine & refine.** Start to organize the mini ideas into bigger solutions. Perhaps have multiple views: this could be two visualizations that demonstrate different aspects of the same information.
5. **Question.** The final stage is to question what has been generated. Does this provide a solution that the client wants? Does it answer the original research questions?

This process can be run as a group activity. It is important to consider that participants must not initially criticize or evaluate the worth of individual designs. Keep the ideas flowing by getting participants to sketch their individual ideas down on their own sheets of paper (sticky notes are useful in this exercise). Invite and record any ideas that they participants create. Try to make sure that the whole design space of possible designs is covered. Unusual or wacky ideas should be tabled.

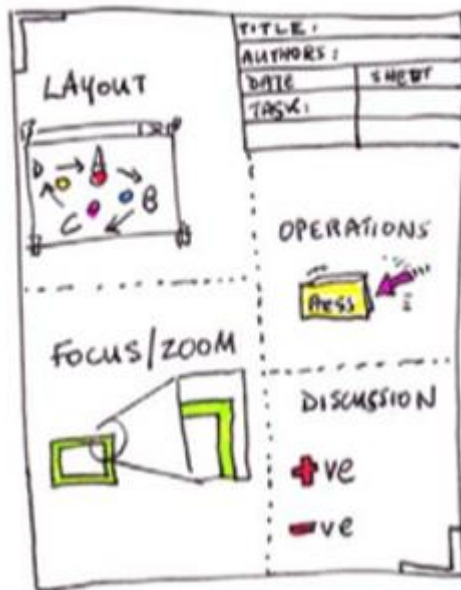
The process as a group participation exercise

All participants listen to the challenge/task

1. Individually write down on sticky-notes their own thoughts
2. Collate all sticky-notes (the ideas) in the group
3. Stack the sticky-notes of similar ideas on top of each other
4. In the group organize the sticky-notes
5. Categorize the idea space by moving the stick-notes into groups of like-ideas
6. Combine and refine the ideas: Use sketching and start to prepare the three main design-sheets
7. Start to discuss the benefits/challenges: or advantages/disadvantages of the categorized ideas

Sheets 2/3/4 - *Initial Ideas*

SHEET 2,3,4



Introduction

The three individual design sheets are to record three ideas from the initial brainstorming exercise. The use of the number three is for guidance only. But it is recommended that three design sheets are created.

Too few designs mean that it is difficult to have a discussion with the client. Too many and it would waste the client's time. It may be that there are only two sensible designs, but it would be better to create a third design, however unusual or unfeasible it seems, because the client may be able to see or extend the ideas through discussion. They may be able to see an application of the idea further than you can.

Keep to the 2:3 split design of the Five Design-Sheets layout.

These design sheets should represent three completely different designs. Consider the hyperspace of possible designs, the three that you should propose should cover this design space well.

Panels

The Content of the three design sheets should all look the same, with the 5 parts. These are named “panels”.

1. **Layout.** Also known as the Big Picture Panel, the layout panel contains pictures of what the final design would look like. Remember you could give this design to someone else to create, so you are basically saying “my design will look something like this”. So if you are building a website of many pages, you will need

to include several pictures to describe the main pages of that site. If you are designing a new mobile phone App, then you should have a picture of a wire-frame mobile phone, with some content. If you are designing a powerwall, then sketch a picture of the size and shape of the display along with a typical room that it will fill. Thus your design will be showing in the place of use. In this panel you are sketching a vision of what the final visualization would look like. Commonly this would appear as a sketched screenshot of the typical visualization application. You will also need to label the parts here. As they will need to be listed out under Components/Operations.

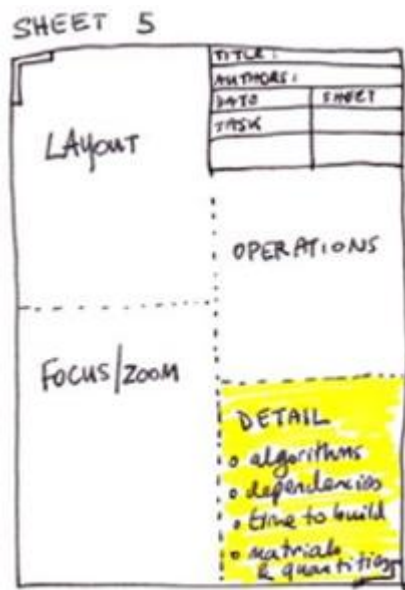
2. **Focus (the Parti panel).** The idea of a parti comes from architecture. It is the main underpinning concept. Think about the main essence of your idea. In this panel you will need to sketch and write about the main idea. You can also think about the part of the idea that the user will focus and spend most of their time doing. If an implementer of your design, does not include this “thing” then your design will not be suitable for use. To complete this panel, start off by writing a 2- or three-word name of the idea - by considering a few words, or a name for this idea, you will be able to consider the important aspects of the design. But also you can use this name to reference back to the idea at a later stage. Then add some sketches and words to describe the essence. There may be a few key visualization techniques, or, novel visualizations that are being created for this tool, whatever they are, they should be described in the Focus/Parti section.
3. **Components/Operations.** Depending on what you are designing, either put a list of the component parts, or a list of the operations. So, if you are designing a new tiled screen, you could add a list a component parts. The screen itself, mounting structure, way to connect the HDMI ports to each screen, power cables and connectors, the computer requirements and way to connect it. If you are designing a new Application, you will have the several component parts, visualisations, menu items. But also, you will have some operations on those parts. Click here to select the menu, which then opens the file browser. In this case you will have Action/Result pairs. E.g., click to open a file browser. Add labels, which correspond to the Big Picture Panel, and sketches and some brief descriptions of how the user operates the visualization or controls the user interface should also be included.
4. **Pro/Cons and discussion.** Describe the Pros and Cons of the technique. Be descriptive and justify ideas. Don't just say “it's good” say why it is good.
5. **Summary information.** In the summary/meta-information panel, you include the general information (authors, date, sheet number and task), but also a title of the idea, and a short 2-line description of the challenge. E.g., Flood Fill Explanation could be a short descriptive title, with a description as “Designing an

explanatory visualisation of the Flood Fill Algorithm, that fills polygons with pixels”.

The three middle-design sheets aid you in your discussion with the client. The sketches give the appearance that the ideas could change. Also, the designs give the client an understanding of the breadth of possible outcomes.

There are different approaches to designing the Big Picture and Parti/Focus sections of the design sheet. One method is to follow Dan Roam's suggestions of sketching designs that are Portrait, Chart, Map, Timeline, Flowchart, and plot. Each of these represents who/what, how much, where, when, how and why, respectively. Dan Roam also suggests that the designer should think about whether they are simple vs elaborate diagrams, quantity, or quality, visionary or execution, individual or comparative.

Sheet 5 - **Realization**



Introduction

This is the realization design. This is the Final Sheet, and it will be the one that someone will implement. So it needs much more detail and depth, and care and attention. It will contain enough design information and description for someone to be able to implement it.

The structure of this sheet is the same 2/3 split as the middle-sheets, but the main difference is that the final panel includes Detail (information of what to do now, or issues to consider, to implement the design) rather than the pro/cons panel.

Panels

1. **Layout.** Same information as the middle sheets.
2. **Focus/parti panel.** The short title, along with the summary of the essence and underpinning structure of the main idea.
3. **Summary.** Meta information (author, sheet, date etc.). along with the two or three word descriptive title, and a 2-line description of the idea.
4. **Operations/components.** Either a detailed list or description of the main components of the system, which are also labelled the same numbers as the labels in the Big Picture/Layout panel. Or a set of operations to describe the Action/result pairs for the interface.
5. **Detail.** Description of the next steps and how to make this idea a reality! The detail panel could include.

- Description of what algorithms are being used (perhaps citations of those algorithms or some critical maths used by the algorithm)
- Any dependencies. E.g. this could be software libraries that the tool would be built upon, or aspects such as that it must be compatible with a current tool.
- Estimates of cost or time to build, or man-months of effort.
- Specific requirements such as details of any materials and quantities required. E.g. hardware requirements, quantity of pixels on a screen.