

Exploring HANOMADE SOAPS as a Visualization Medium

Abstract We ordered handmade soaps to visually reflect 12 digital visualization designs in our previous work. These soaps were planned to be New Year gifts so we picked colorful and distinctly shaped designs and did not emphasize on the accuracy of the final results. However, we found many surprising outcomes. The colors precisely matched the designs while the shapes varied. Our expectations of the 12 designs did not match the soap maker's evaluations. Their comments were noted for picking designs suitable for soap making in the future. This can be helpful for further explorations of other physical materials for visualization.

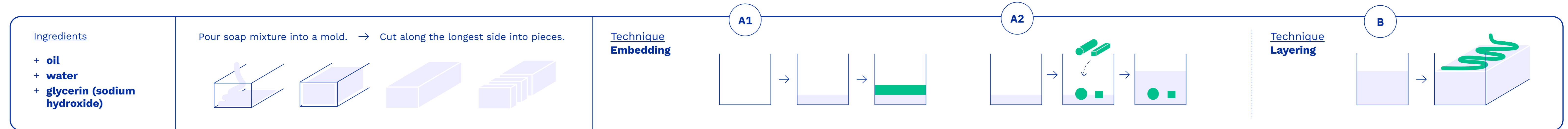
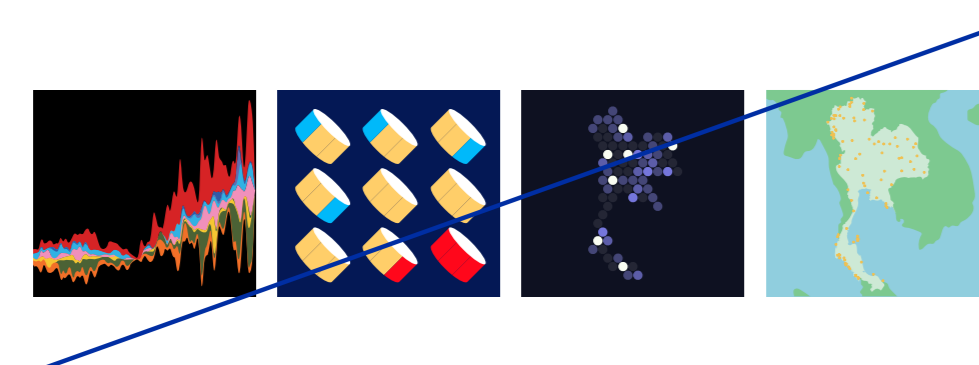
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Design and Implementation

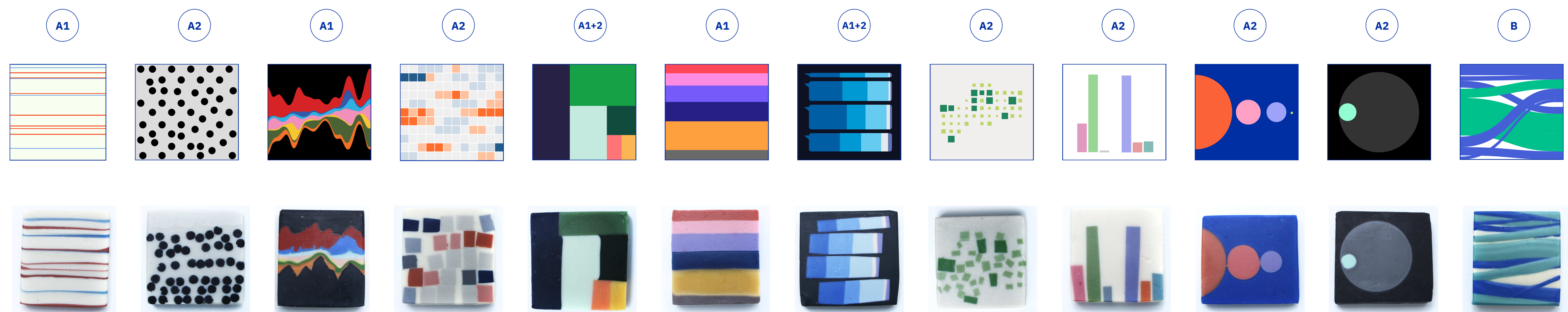
The designer contacted the soap maker and picked 12 designs in various visualization types such as heatmap, tile grid map, bubble chart, treemap, bar chart, stacked bar chart, mosaic plot, alluvial diagram, and streamgraph. They were all adapted from a list of selected digital visualizations made by her team in 2020. The colors were taken directly from the original designs.

These 4 designs were rejected by the soap maker due to their production difficulty. Patterns of complex details, especially of recognizable shapes, were hard to make and predict the final results.



Results and Discussion

All soaps were the first try except ones for **streamgraph**, which we sent back for a new batch that should more closely follow the original design. We investigated the problem and the soap maker simply did not understand the underlying visual grammar; she assumed the streams were random colorful lines across the tablet. It is noteworthy that the soap maker did not even consider the streamgraph as the most difficult visualization to replicate. Some soaps showed the limitations of soap making. For instance, the bars in the **mosaic chart soap**, the squares in the **heatmap soaps** and **tile grid map soap** rarely aligned. Circular or curvy objects looked better in general and visually resembled their designs.



Difficulty Evaluated by the Soap Maker

The soap maker later rated the results based on production difficulties and visual preferences. Note that the difficulty ranking matched the soap maker's initial evaluation that only the stacked bar charts, treemap, and streamgraph would look similar to the designs.

Difficulty Estimated by Another Soap Maker

We also asked an independent soap maker to rank the designs by how hard to make them. The rankings of two soap makers mainly align except the designs of a **tile grid map**, an **alluvial diagram**, and a **stacked bar chart**. The limitations of the production of the first two visualizations have been discussed. On the stacked bar, we inquired further and they answered that the number of required soap layers and embedded soaps naturally affected the implementation difficulty; the more layers or objects a design has, the more time and experience it needs.

Difficulty Estimated by the Designer

Preference by the Soap Maker

The preference ranking did not reflect visualization faithfulness. There are visualizations that the soap maker considered them as attractive but they did not represent their respective visualizations well. This was mainly because the soap maker did not understand their visual languages or grammars. This can informally reflect how common the visualizations are used in Thailand. Some notable designs that are preferred by the designer and also generally easy to make are the circular designs

Preference by the Designer

