

# Report Diary: Visualization and Interaction Design

## Sketches and Design Alternatives

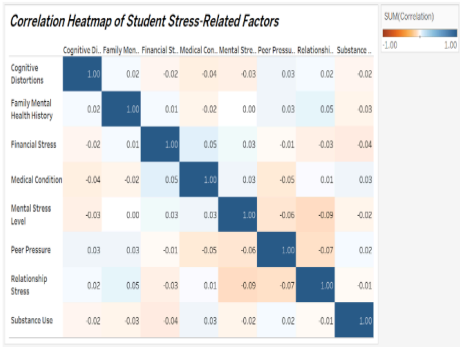
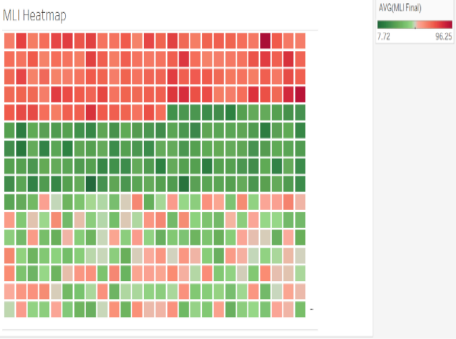
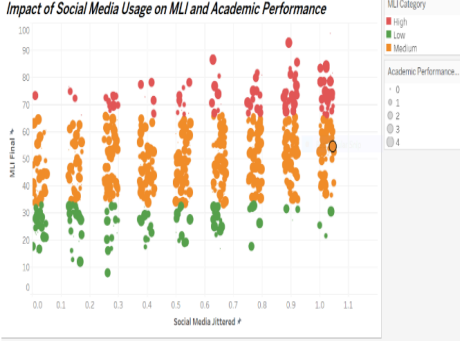
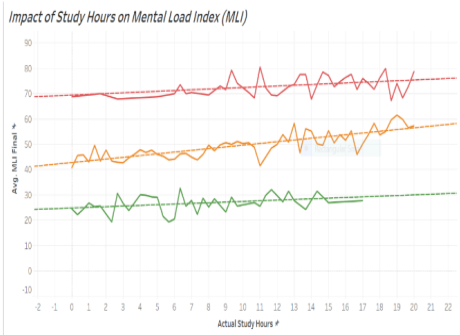
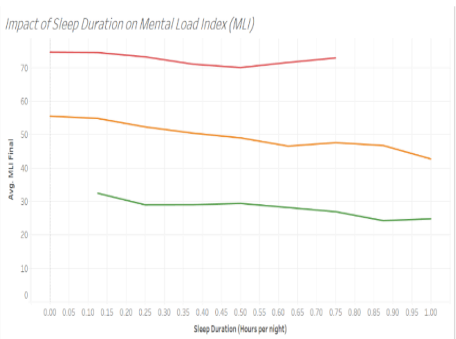
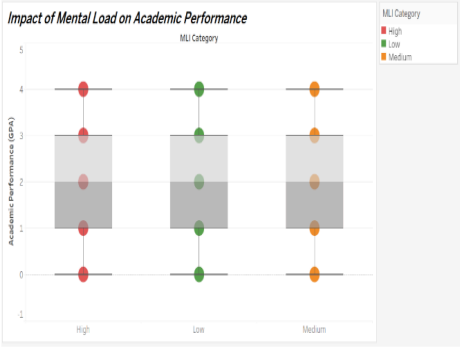
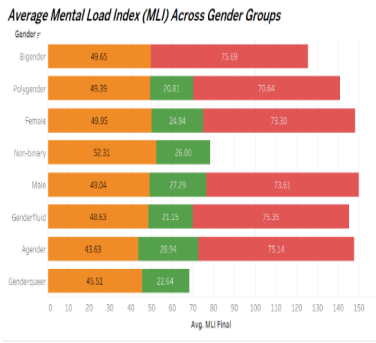
In order to explore the relationship between lifestyle variables and mental load, I began by reviewing several types of charts for every variable. Initially, I considered employing pie and donut charts to illustrate the contribution of different stress inputs but realized that they didn't serve well to display relationships or numeric accuracy. I also looked into scatter plots, line charts, jittered displays, and calendar heatmaps for other displays of time and category-based data.

For purposes of stress input comparison, I ultimately rejected the donut chart approach in favor of a correlation heatmap that more accurately portrays the data and interdependent relationship between variables such as Financial Stress, Relationship Stress, Cognitive Distortions, and Substance Use.

## Prototype Progress

Worksheet	Chart Type	Main Goal
MLI by Gender (Sorted)	Bar Chart (Horizontal)	Compare mental load across genders
GPA Distribution vs MLI Show	Category Grouped Bar Chart	GPA distribution per MLI level
Sleep Duration vs MLI	Line Chart	Trend of sleep vs MLI by category
Study Hours vs MLI	Line Chart with Trendlines	Observe how study affects mental load
Social Media Usage vs MLI	Scatter Plot	Explore correlation between MLI and social media
Simulated MLI Heatmap (Simulated)	Calendar-Grid Heatmap	Show MLI distribution over a virtual timeline
Stress Factors	Correlation Heatmap	Visualize interdependencies between stress dimensions

Screenshots:



## **Justification of Visual Encodings**

I tried exploring visual encodings to understand the influence of lifestyle factors on the Mental Load Index (MLI) of students. I began by plotting lines to search for trends, such as the relationship between study hours and sleep duration with MLI. To better read crowded data in scatterplots, I utilized jittered plots, especially within the "Social Media Usage vs MLI" sheet. It made dense dots easier to read without distorting the distribution.

I was originally going to use pie or donut charts to show the contribution of the different stress inputs. I replaced them with a correlation matrix heatmap for analytical clarity. This allowed comparison between variables like financial stress, peer pressure, and cognitive distortions more intuitively. Color coding (green to red) allowed visualization of strength and direction of correlations at a glance.

I also made a calendar-type simulated heatmap to represent differences in MLI over a pseudo-time layout. Each square represents a student, helping to identify trends in the level of stress. All the data used in the charts was normalized so that comparison would be on an even level between variables with different units of measurement.

## **Reflection**

### **Challenges and Solutions**

Throughout the project, I encountered various issues like overlapping points in scatterplots, uneven units between variables, and misleading pie chart ratios. I solved these using jittering, normalizing data, and replacing the pie chart with a correlation heatmap. Other issues such as ATTR() being shown in tooltips, limits on pivot on calculated fields, and grid misalignment in heatmaps were resolved using tailored tooltip text, raw column pivoting, and constructing row/column indices.

### **Group Meeting Reflection**

Feedback confirmed that the heatmap and jittered scatterplot were more insightful than traditional charts. My groupmates suggested some color palettes which I have implemented in the charts. Overall, the visuals now provide a clearer view of how lifestyle habits and stress factors are intertwined with academic outcomes.

## **Conclusion**

and analytical value. I shifted from basic exploratory plots towards more advanced visual encodings, ultimately arriving at comparisons and correlations, which are more aligned with the project's core intention.

**Acknowledgement:**

ChatGPT was used to enhance grammar, sentence structure, and overall flow of the writing.