Student Sleep Patterns

Information Visualization Project
Final Presentation

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Data

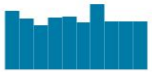
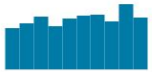
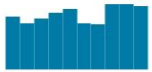
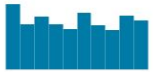
Dataset Overview

student_sleep_patterns.csv

Source: Dataset representing university students' sleep, study, and lifestyle habits.

Scope: 500 unique student records, including demographics like age, gender, and academic year.

Main Variables:

Student_ID	Age	Gender	University_Year	Sleep_Duration	Study_Hours	Screen_Time	Caffeine_Intake	Physical_Activity	Sleep_Quality
 1 500	 18 25	Male 37% Female 33% Other (148) 30%	3rd Year 26% 2nd Year 26% Other (237) 47%	 4 9	 0.1 12	 1 4	 0 5	 0 120	 1 10
1	24	Other	2nd Year	7.7	7.9	3.4	2	37	10
2	21	Male	1st Year	6.3	6.0	1.9	5	74	2
3	22	Male	4th Year	5.1	6.7	3.9	5	53	5

Dataset Overview

mental_health_and_technology_usage_2024.csv

Source: Dataset representing daily technology usage and mental health indicators of individuals.

Scope: Analysis of 10,000 individuals across age and gender, exploring links between technology use, stress, mental health, and sleep quality.

Main Variables:

User_ID	Age	Gender	Technology_Usa...	Social_Media_Us...	Gaming_Hours	Screen_Time_Ho...	Mental_Health_S...	Stress_Level	Sleep_Hours
101	45	male	3.0	3.0	5.5	4.0	2.0	4	8
10000 unique values	18 65	Other 34% Male 34% Other (3286) 33%	1 12	0 8	0 5	1 15	Excellent 25% Good 25% Other (4974) 50%	Medium 33% Low 33% Other (3330) 33%	4 9
USER-00001	23	Female	6.57	6.0	0.68	12.36	Good	Low	8.01
USER-00002	21	Male	3.01	2.57	3.74	7.61	Poor	High	7.28
USER-00003	51	Male	3.04	6.14	1.26	3.16	Fair	High	8.04

03

Context

Context

Why Study Student Lifestyle and Sleeping Patterns?

Student Life Challenges

Balancing academic pressure, social activities, and personal well-being.

Impact of Choices

Lifestyle habits influence not only academic performance but also mental and physical health.

Our Focus

Identifying patterns that reveal how daily habits affect students' well-being, helping to inform better decisions.

04

Target Users

Users and needs

University Students

Study lifestyle impacts on student sleep patterns to guide healthier habits.

Psychologists

Curious about how daily habits affect sleep quality and well-being.

Researchers

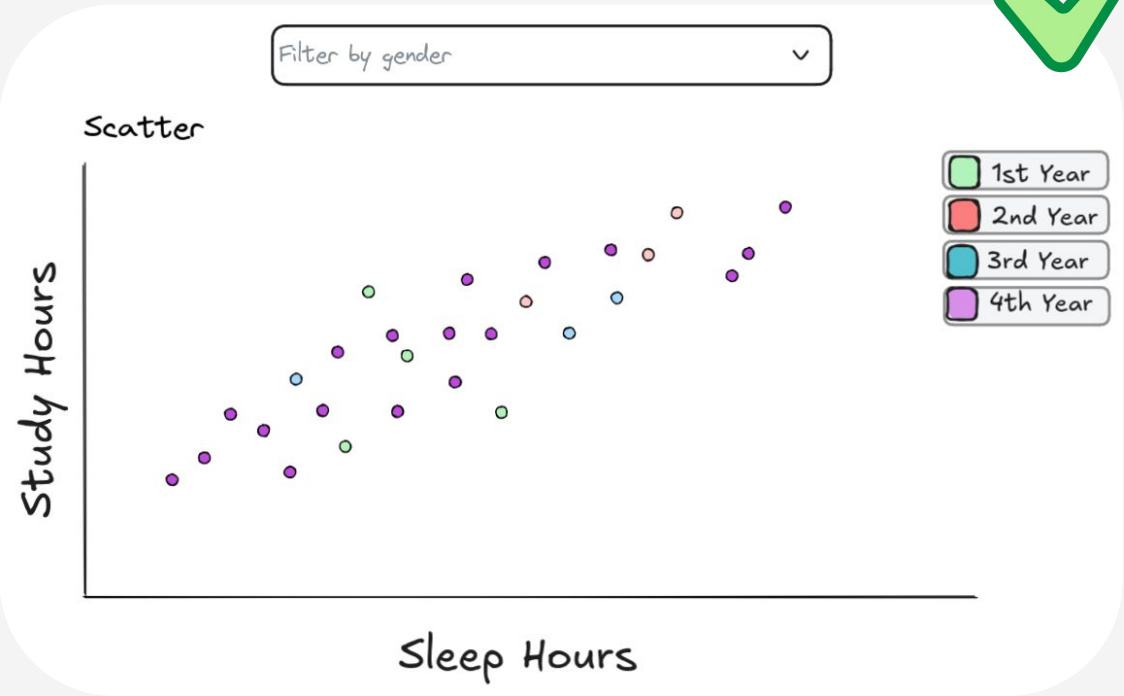
Analyze lifestyle factors to uncover patterns in student health and wellness.

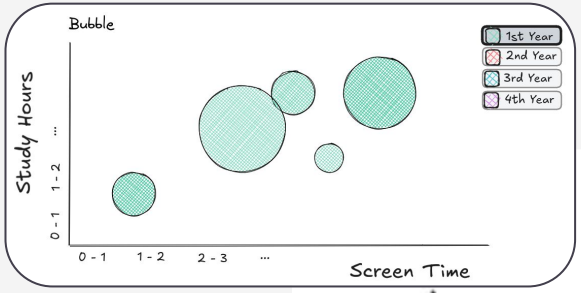
05

Low Fidelity Prototype

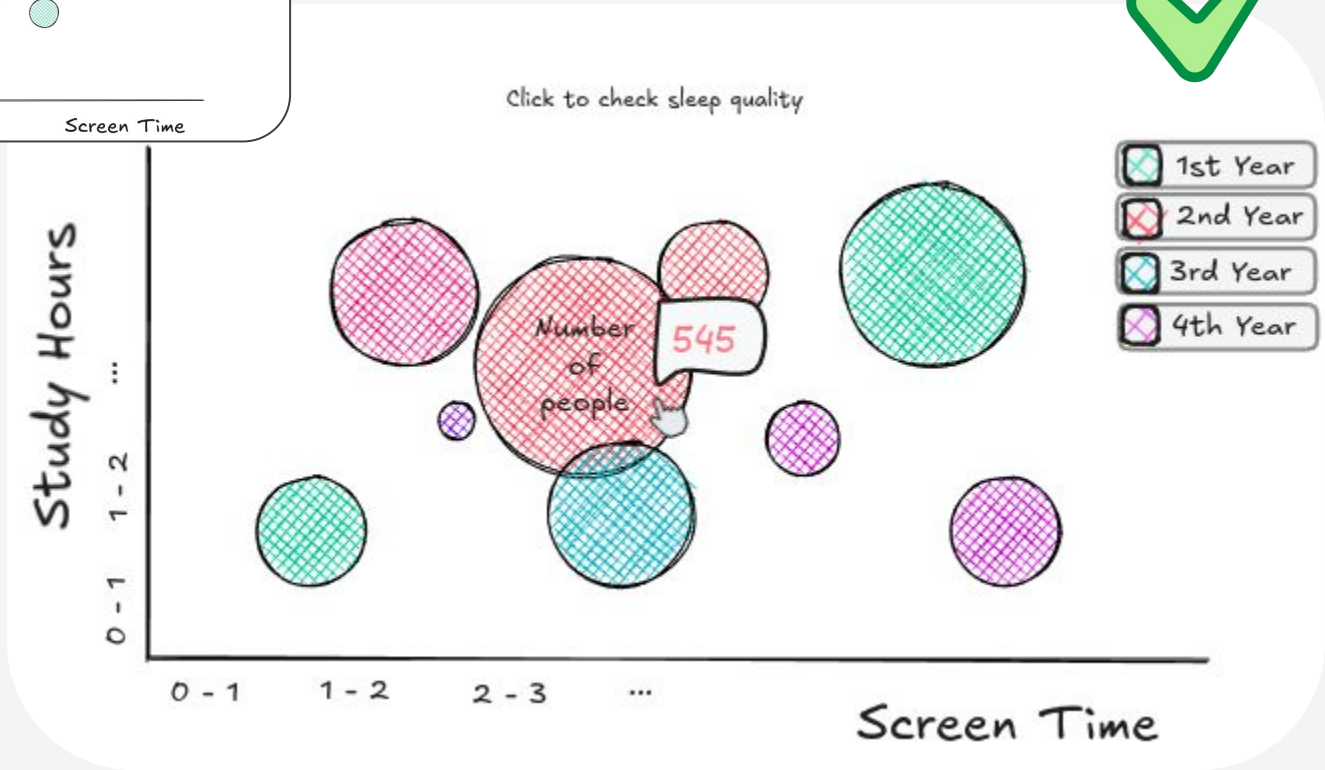
Scatterplot

Study Hours vs. Sleep Hours



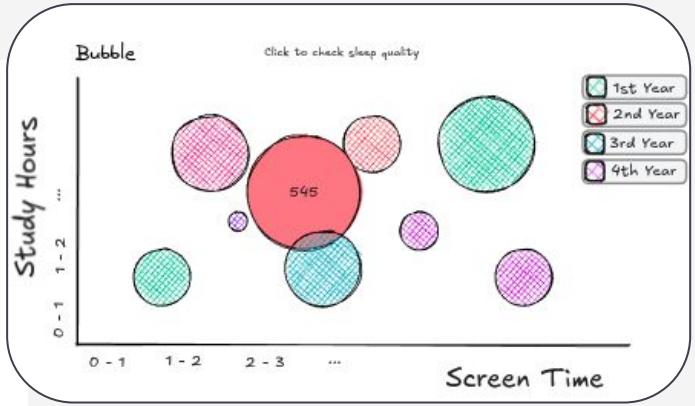


Bubble Chart



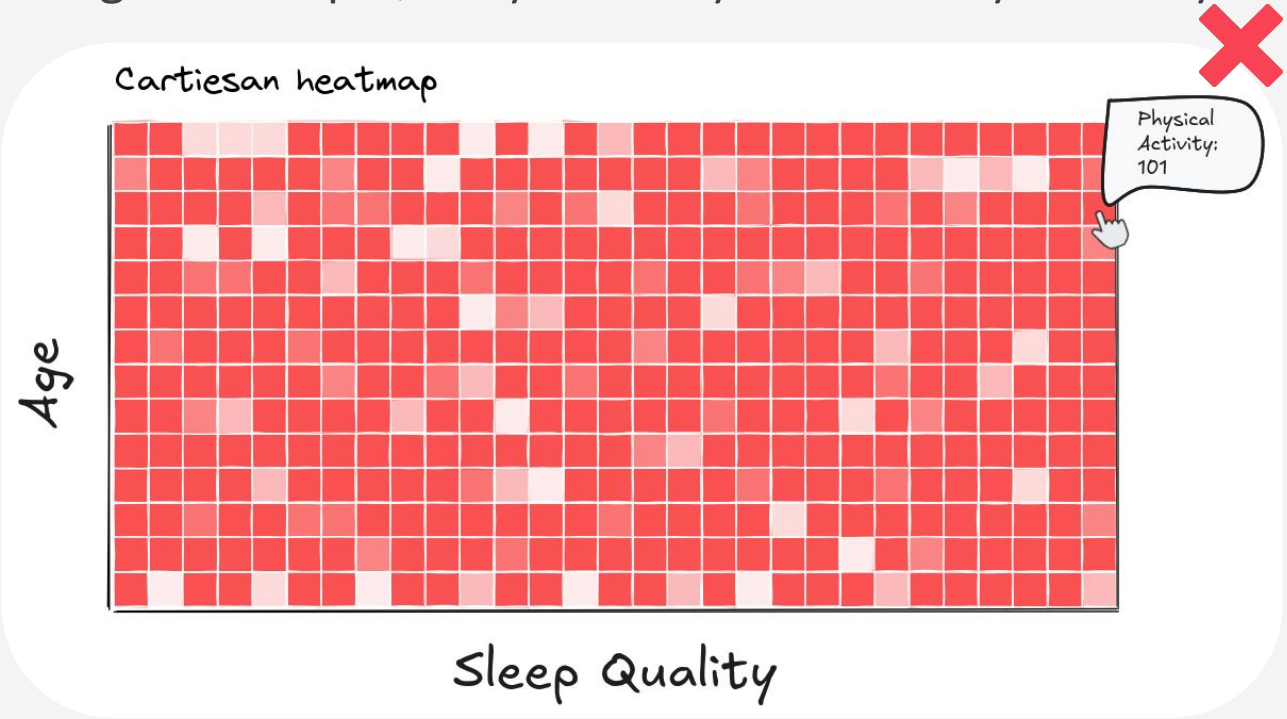
Bar Chart

Number of Students With different Sleep Quality



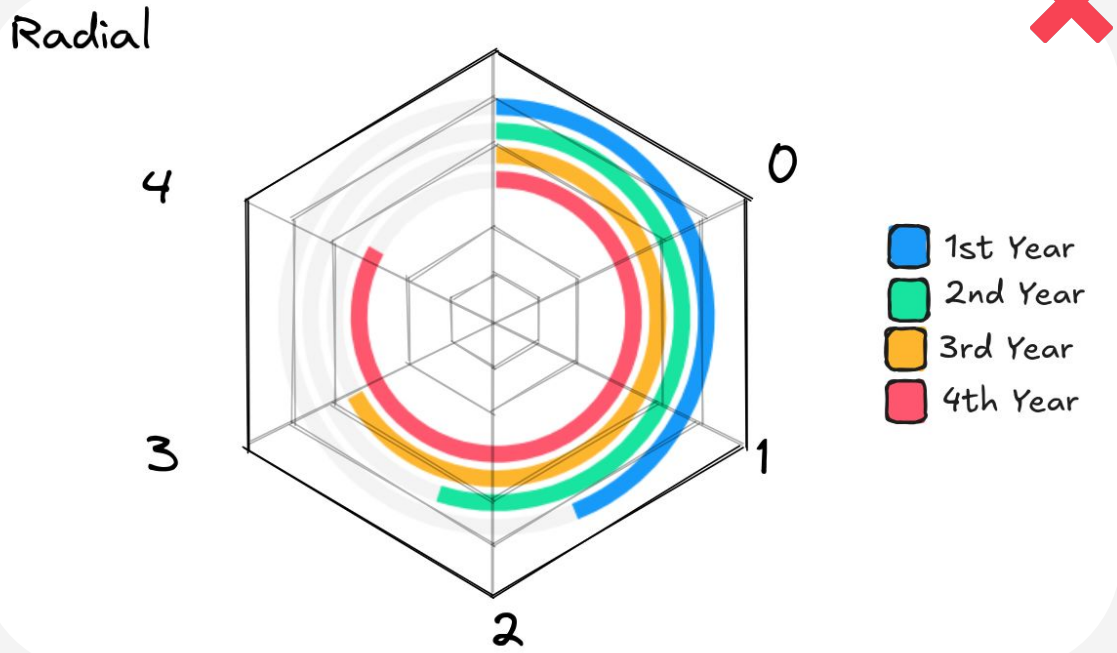
Heatmap

Age vs. Sleep Quality with Physical Activity Intensity



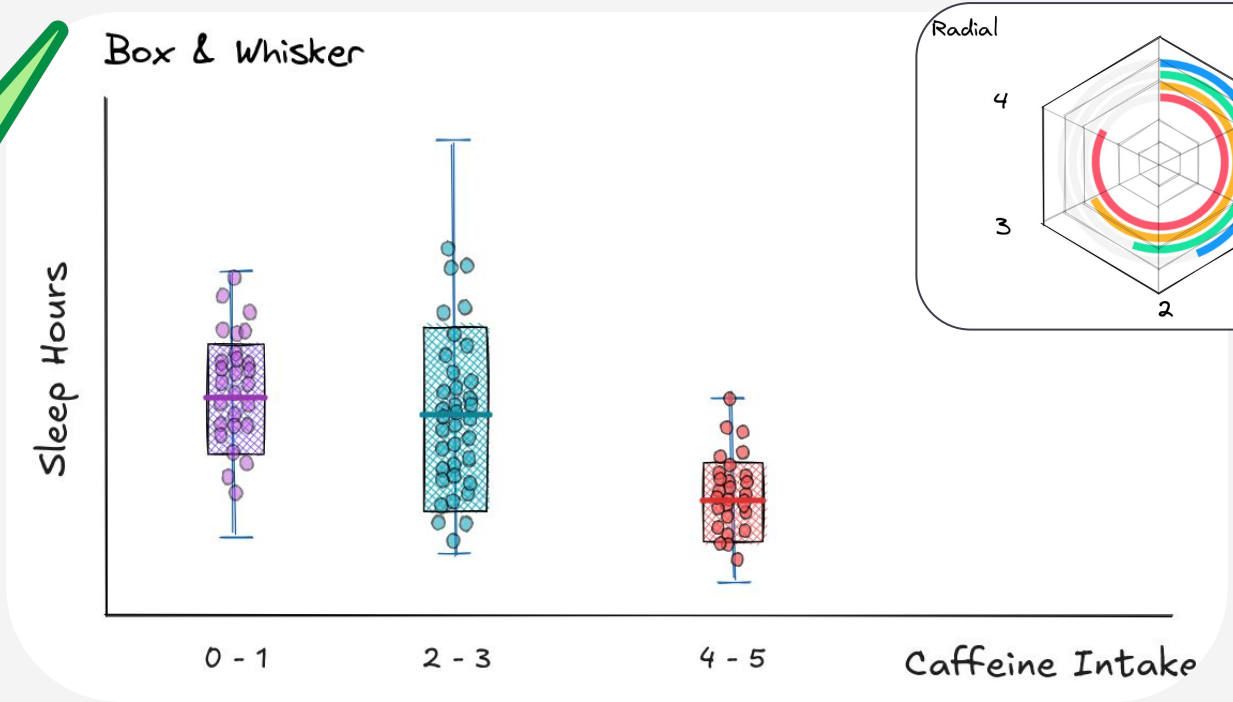
Radial Bar Chart

Caffeine Intake by University Year



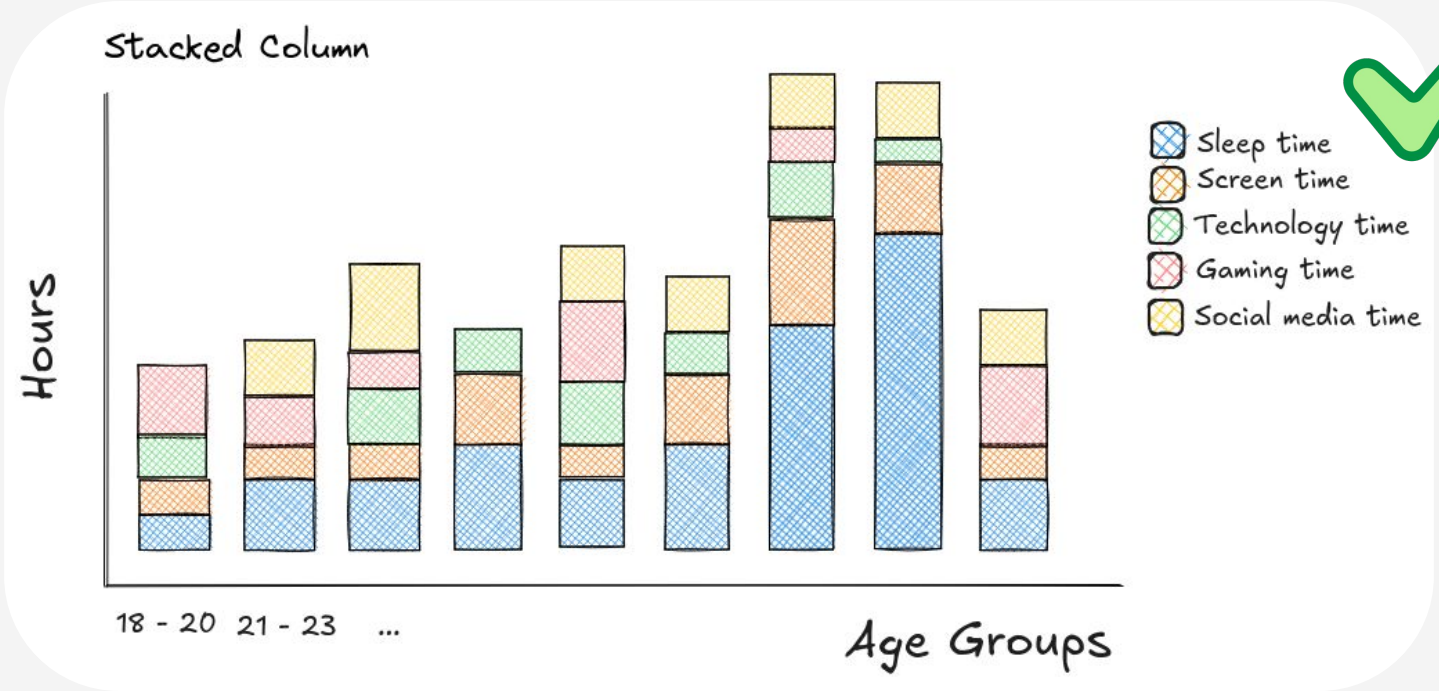
Box plot

Relationship Between Caffeine Consumption and Sleep Hours

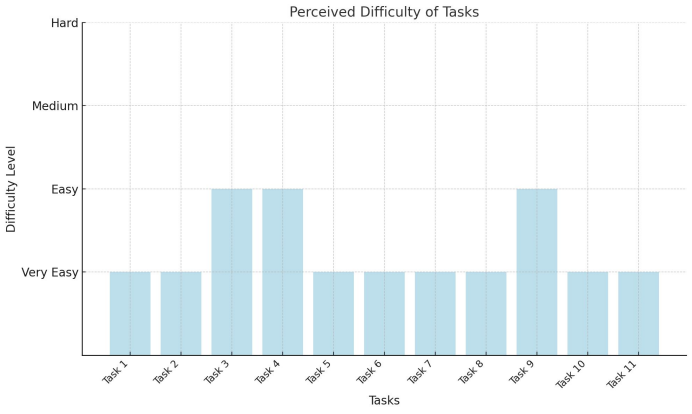


Stacked Bar Chart

Screen, Sleep, Technology, Gaming, and Social Media Hours by Age of **Non Students**



LFP User Evaluation (4 participants)



Scatter plot:

1. Which university year is associated with the highest volume of data?
2. Can you filter the chart by gender?

Bubble plot

3. How many students does the largest data group in this chart represent?
4. What is the sleep quality value for this group of students?
5. Go back and select only first-year university students.

Heatmap

6. What is the average physical activity level for 19-year-old students with a sleep quality of 2?

Radial Bar Chart

7. What is the average caffeine consumption for third-year university students?
8. View more details about caffeine consumption for first-year university students.

Box plot

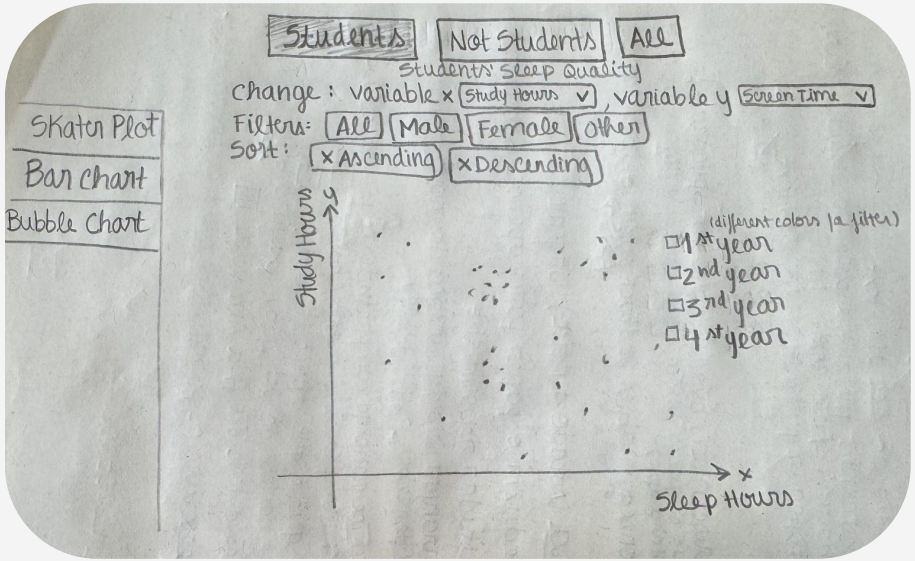
9. What is the average coffee consumption for students who have the least sleep hours?
10. Look for details about non-students.

Stacked Bar Chart

11. Which age group has the least sleep hours?

Feedback Received

- Users found too many graph types overwhelming.
- Recommendation: Reduce the number of graph types.
- Prioritize fewer, more intuitive visualizations.
- Enable variable customization within selected graphs.



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Functional Prototype

Technologies

Structure and content of the website

Styling and layout design

Responsive and user-friendly framework

Interactive and dynamic visualizations

Logic and functionality implementation

Heuristic Evaluation

Jakob Nielsen's 10 Usability Heuristics for UI Design.

Severity Rate:

0	Not a usability problem
1	Cosmetic problem
2	Minor usability problem
3	Major usability problem
4	Usability catastrophe

Heuristic Evaluation

Jakob Nielsen's 10 Usability Heuristics

01. Visibility of System Status

Issue: No issue
Severity Rating:

02. Match Between System and Real World

Issue: Some activity names include underscores instead of spaces (e.g., "Social_Media_Usage_Hours"), which feels too technical.

Severity Rating: 0

03. User Control and Freedom

Issue: There is no global "reset" button to restore the initial state of the charts, forcing users to manually reset all options.

Severity Rating: 2

04. Consistency and Standards

Issue: Users can select the same variable for both the X and Y axes, which is inconsistent and can lead to confusion.

Severity Rating: 2

05. Error Prevention

Issue: The backend does not validate unexpected input data, which could cause the system to fail if the user provides invalid data.

Severity Rating: 3

Heuristic Evaluation

Jakob Nielsen's 10 Usability Heuristics

06. Recognition Rather than Recall

Issue: No issue
Severity Rating:

07. Flexibility and Efficiency of Use

Issue: No issue
Severity Rating:

08. Aesthetic and Minimalist Design

Issue: No issue
Severity Rating:

09. Help Users Recognize, Diagnose, and Recover from Errors

Issue: Error messages are not specific for issues like data loading or invalid filters, leaving users uncertain about how to fix problems.

Severity Rating: 3

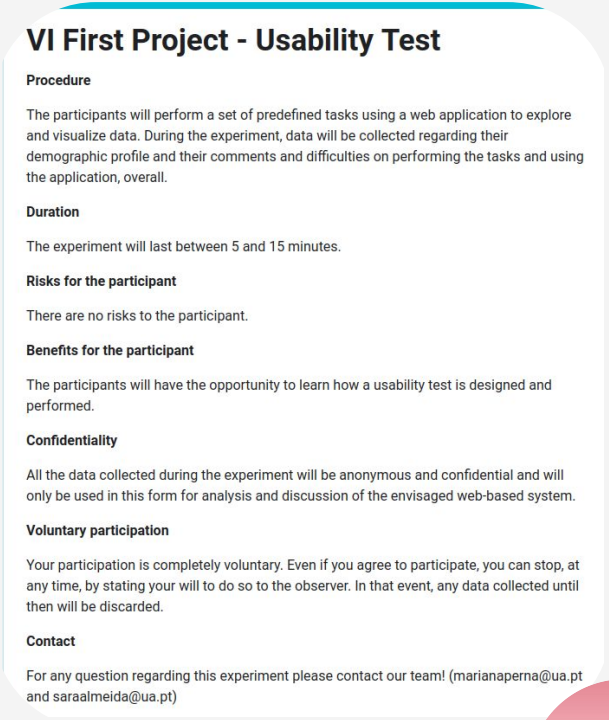
10. Help and Documentation

Issue: A quick-start guide or in-app tips could significantly enhance user onboarding.

Severity Rating: 1

System Usability Scale (SUS)

- We asked colleagues to explore our application and fill in the questionnaire
- 4 participants - students between 20-22
- The average SUS score value was **81**



VI First Project - Usability Test

Procedure

The participants will perform a set of predefined tasks using a web application to explore and visualize data. During the experiment, data will be collected regarding their demographic profile and their comments and difficulties on performing the tasks and using the application, overall.

Duration

The experiment will last between 5 and 15 minutes.

Risks for the participant

There are no risks to the participant.

Benefits for the participant

The participants will have the opportunity to learn how a usability test is designed and performed.

Confidentiality

All the data collected during the experiment will be anonymous and confidential and will only be used in this form for analysis and discussion of the envisaged web-based system.

Voluntary participation

Your participation is completely voluntary. Even if you agree to participate, you can stop, at any time, by stating your will to do so to the observer. In that event, any data collected until then will be discarded.

Contact

For any question regarding this experiment please contact our team! (marianaperna@ua.pt and saraalmeida@ua.pt)

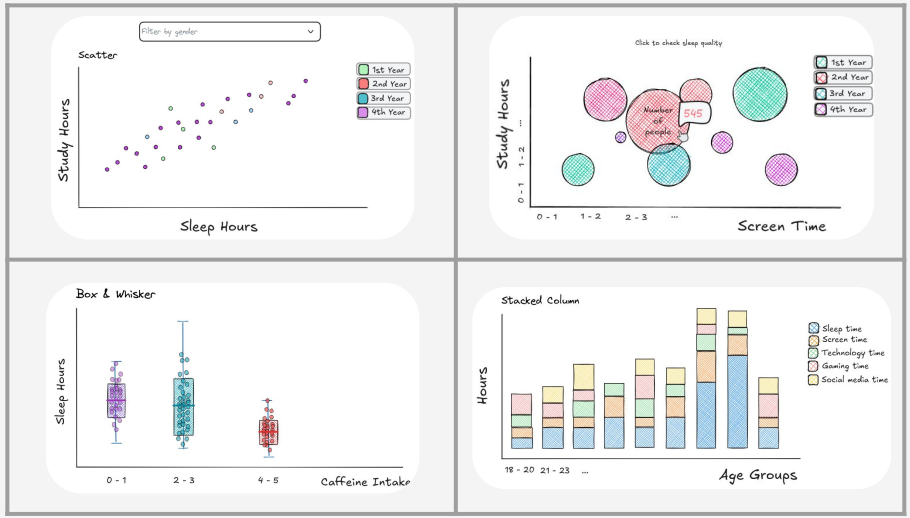
User Feedback & Improvements

Main suggestions:

- More clear graph labelling and variables unit;
- Count number not inside the bubble in Bubble Chart;
- Users desired an easier way to compare different visualizations.

User Feedback & Main Implementation Problems

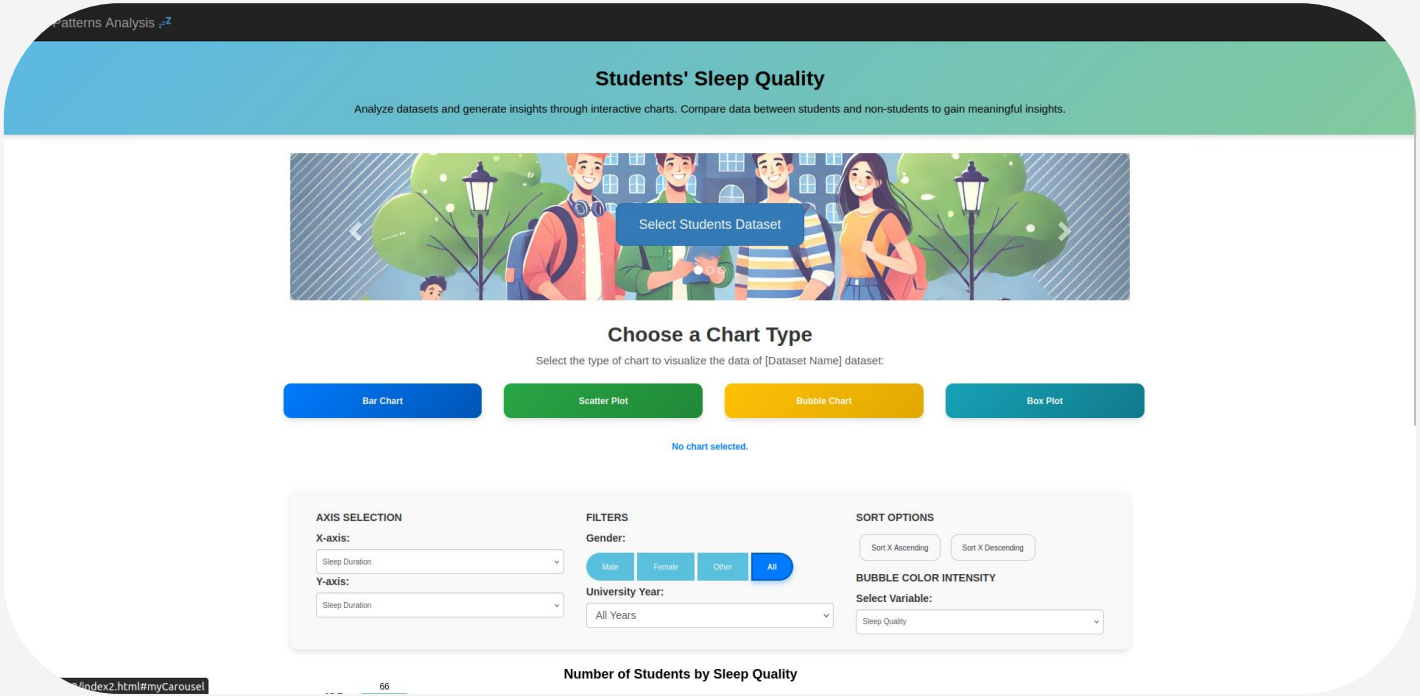
Key Insight:
Users desired an easier way to compare different visualizations.



Solution To Be Implemented:
A Grid View would be a great way to show all the graphs at the same time, turning possible the feature of comparing them.

Functional Prototype

DEMO



Functional Prototype: Future Work

What improvements would we make if we had more time?

Combine Datasets for Deeper Insights

Combine student and non-student datasets for deeper insights.

Improved Error Handling and Data Validation

Improve mechanisms for managing invalid or missing data.

Enhanced Filtering and Analysis Options

Add multi-variable filters for enhanced data exploration.

Thanks!

Do you have any questions?

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