

Project Report of the topic

Comprehensive analysis and dietary strategies with tableau: A college food choices case study

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1. INTRODUCTION

1.1 Project Overview:

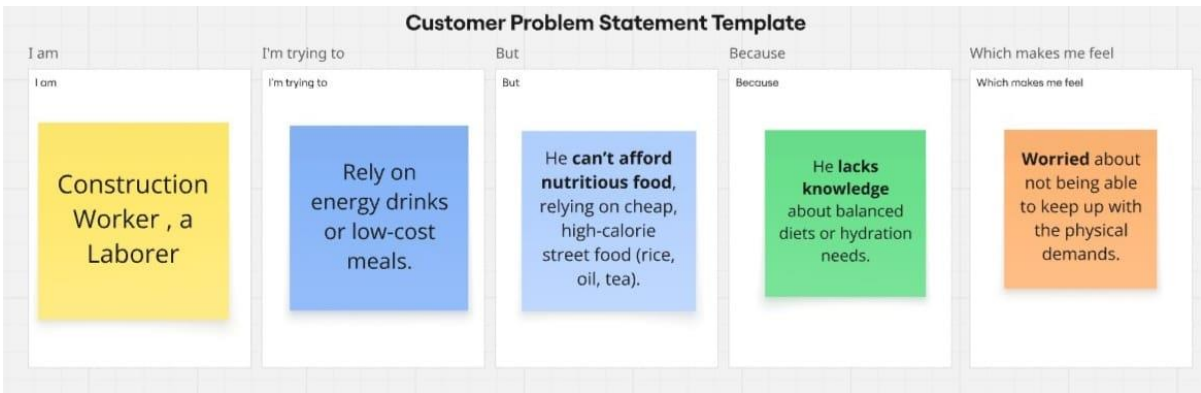
This project, titled "Comprehensive Analysis and Dietary Strategies with Tableau: A College Food Choices Case Study," aims to explore and understand the food habits, dietary patterns, and nutritional behaviors of college students using interactive data visualization tools. With the rising concern for student wellness and mental health on campuses, analyzing food choices can provide significant insights into their physical health, lifestyle preferences, and potential areas for intervention

1.2 Purpose:

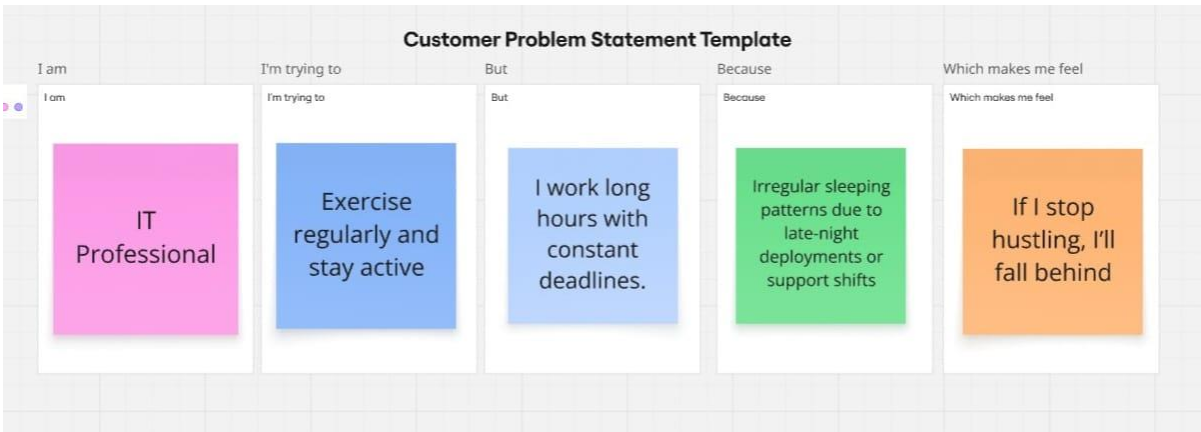
The primary purpose of this case study is to conduct a comprehensive analysis of college students’ food choices and dietary habits using advanced data visualization tools like Tableau. By leveraging real-time data collected from student surveys and behavioral patterns, the study aims to identify nutritional gaps, food preferences, cooking frequency, and health perceptions among students. Through visual analytics, the project seeks to uncover correlations between diet patterns and lifestyle factors such as GPA, exercise frequency, stress levels, and well-being.

2. IDEATIONPHASE

2.1Problem Statement 1:

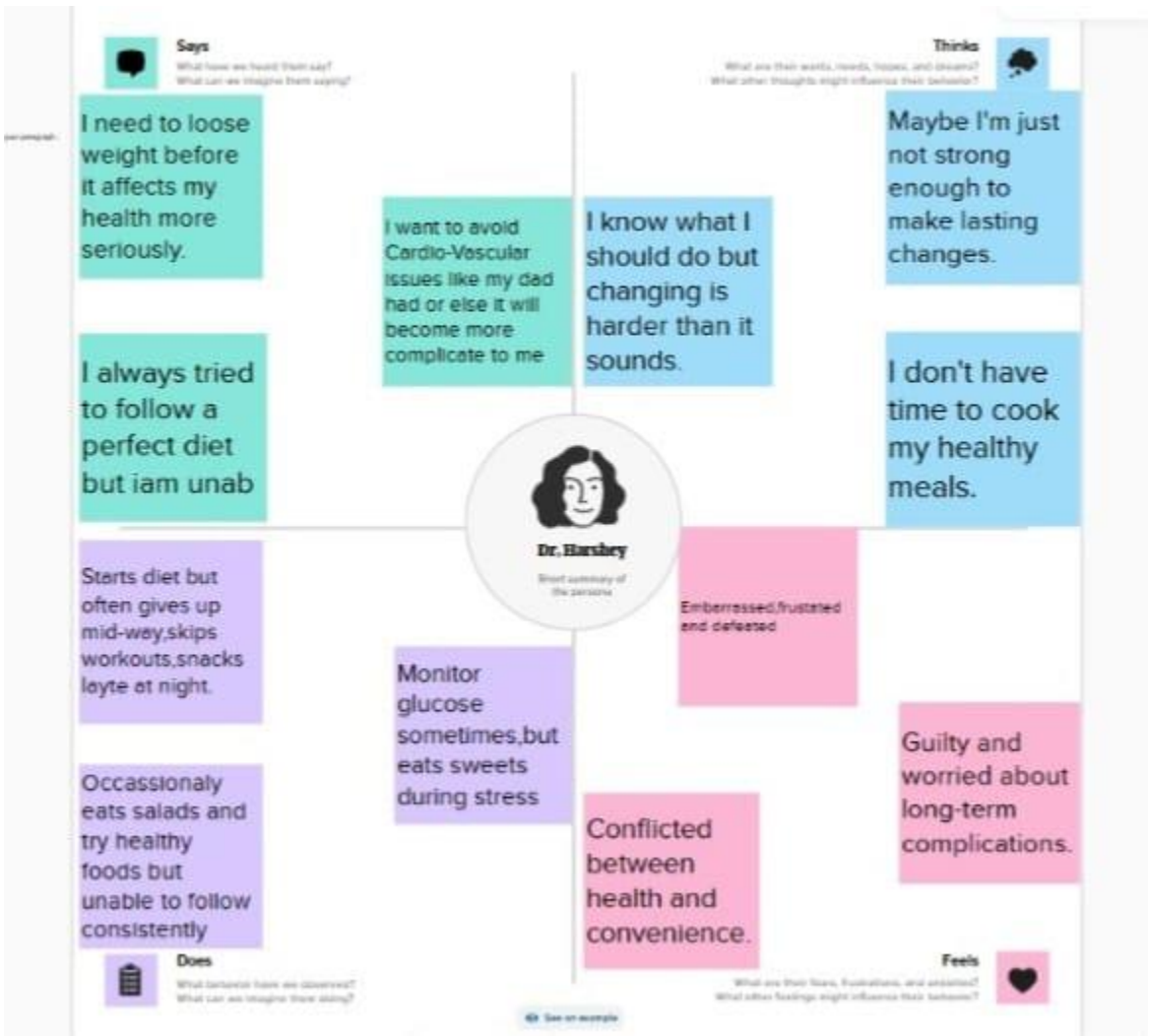


Problem Statement 2:




Problem Statement (PS)	I am (Customer)	I’m trying to	But	Because	Which makes me feel
PS-1	Construction Worker	Rely on energy drinks or low-cost meals	Can’t afford nutritious food,relying on cheap, high calorie, street food	He lacks knowledge about balanced or hydration needs	Worried about not being able to keep up with the physical demands.
PS-2	IT Professional	Exercise regularly and stay active	I work long hours with constant deadlines	Irregular sleeping patterns due to late-night deployments or support shifts	If I stop hustling, I’ll fall behind

2.2 Empathy Map Canvas



2.3 Brainstorming

Step-1: Team Gathering, Collaboration and Select the Problem Statement



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

⌚ 10 minutes to prepare
🕒 1 hour to collaborate
👥 2-8 people recommended

Before you collaborate
A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

⌚ 10 minutes

A Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

C Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) →

1 Define your problem statement
What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

⌚ 5 minutes

PROBLEM
How might we [your problem statement]?

Key rules of brainstorming
To run an smooth and productive session

- 😊 Stay in topic.
- 💡 Encourage wild ideas.
- ⏸️ Defer judgment.
- 👂 Listen to others.
- 🗣️ Go for volume.
- 👁️ If possible, be visual.

Step-2: Brainstorm, Idea Listing and Grouping

Brainstorm
Write down any ideas that come to mind that address your problem statement.

⌚ 10 minutes

Person 1

Weekly meal planning helps avoid last-minute unhealthy food choices.

Include all food groups: **vegetables, fruits, lean proteins, whole grains, and healthy fats**

Stick to regular meal times to maintain **blood sugar balance**.

Person 2

Ensure your diet includes all three macronutrients: carbohydrates, proteins, and healthy fats.

Use smaller plates or measure servings to avoid overeating.

Replace with complex carbs (sweet potatoes, brown rice) and natural sweeteners (fruits, stevia).

Group Ideas
Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

⌚ 20 minutes

Analyze payment methods for food (cash/card/subscription) vs consumption habit

Detect trends in eating out frequency and its impact on academic performance

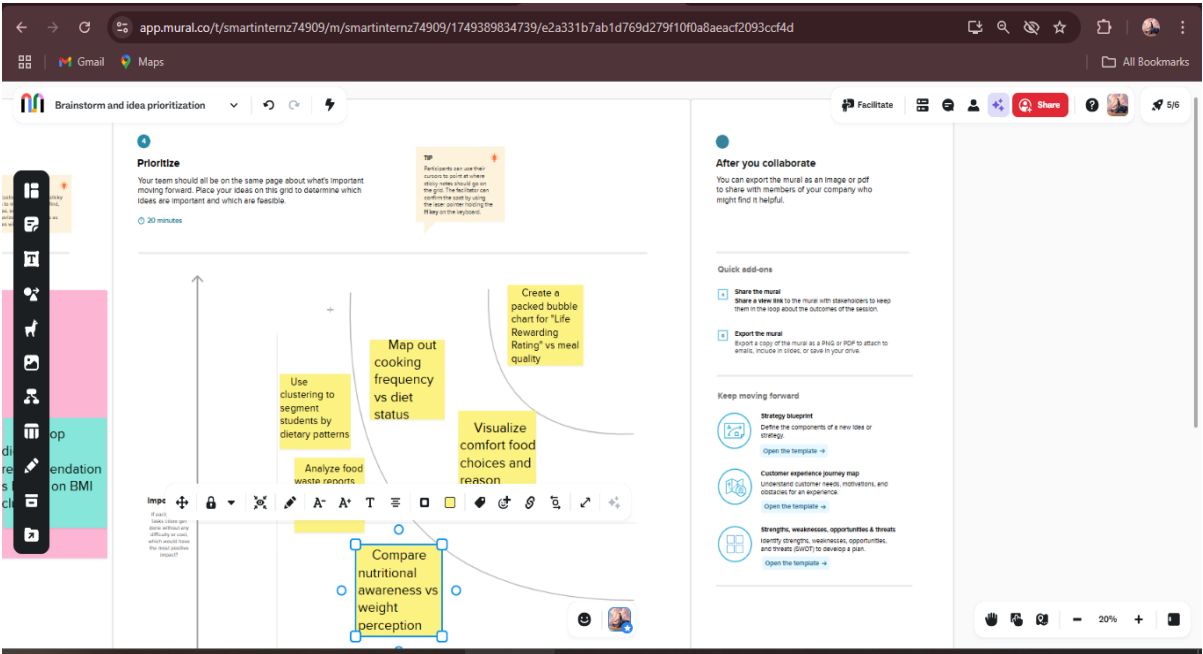
Visualize comfort food choices and reason

Analyze calorie intake per student by meal type (breakfast/lunch/dinner)

Identify popular cuisines and dietary preferences by demographic group

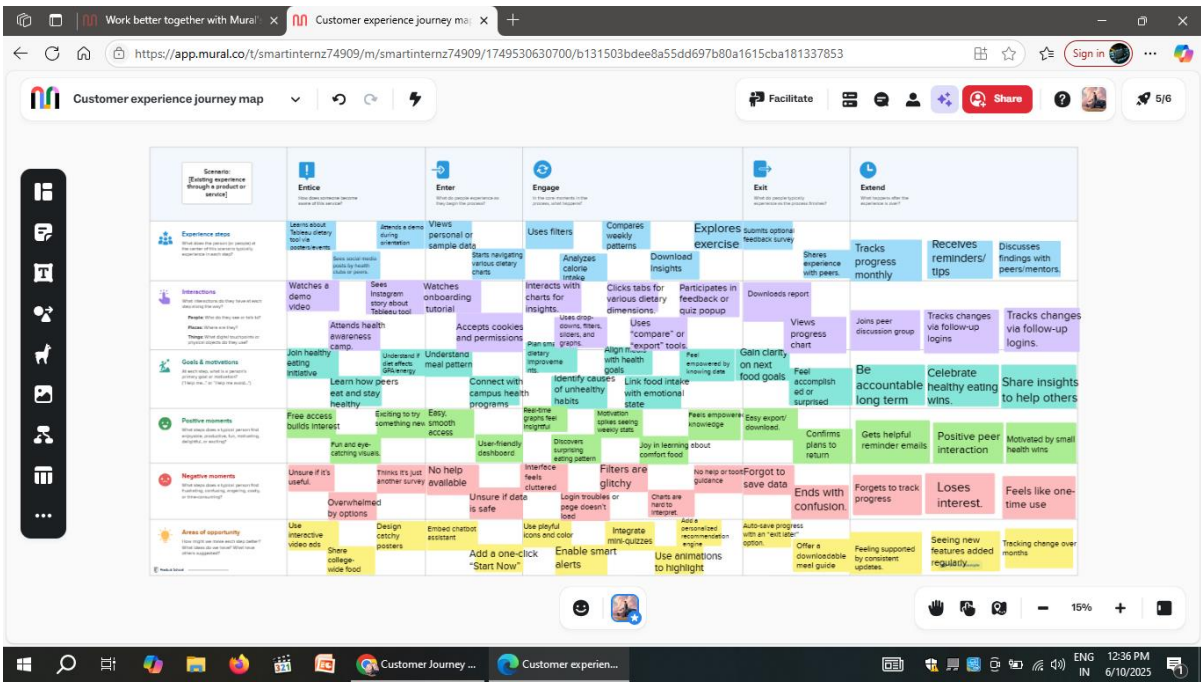
Develop dietary recommendations based on BMI clusters

Step-3: Idea Prioritization



3. REQUIREMENT ANALYSIS

3.1 Customer Journey map



3.2 Solution Requirement

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data Collection & Extraction from Database	Downloading the dataset of the task
FR-2	Collect the dataset	Collecting the required dataset for performing the following task
FR-3	Connect data with Tableau	Connecting the dataset to the tableau public desktop to perform visualizations.
FR-4	Data Preparation	Preparing of the dataset in order to form visualizations
FR-4	Prepare the Data for Visualization	Complete preparation of dataset which includes: 1. Cleaning 2. Pre-Processing 3. Data Interpretation 4. Assigning the rows and columns to the data
FR-5	Data Visualizations	With using the dataset creating interactive visualizations
FR-6	No of Unique Visualizations	Creating the following visualizations : 1. GPA Distribution 2. Gender Distribution 3. Breakfast distribution 4. Calorie Consumption per day 5. Favourite Comfort Foods 6. Comfort Food Reasons 7. Cooking Frequency per week 8. Cuisine Preferences 9. Diet Status 10. Exercise Frequency 11. Employee Status 12. Healthy Feeling 13. Life Rewarding Rating 14. Marital Status 15. Nutritional Check 16. Parental Cooking Habits 17. Meal Payment Habits 18. Weight Self Perception 19. Sports Participation 20. Vitamin Intake 21. Weight Distribution 22. Eating out 23. Coffee Consumption
FR-8	Responsive and Design of Dashboard	Creating well-designed, user-friendly, and interactive interface that adjusts intelligently to different screen sizes, user needs, and data insights
FR-9	No of Scenes of Story	Creation of distinct view or visual segment of your story — typically, each dashboard tab

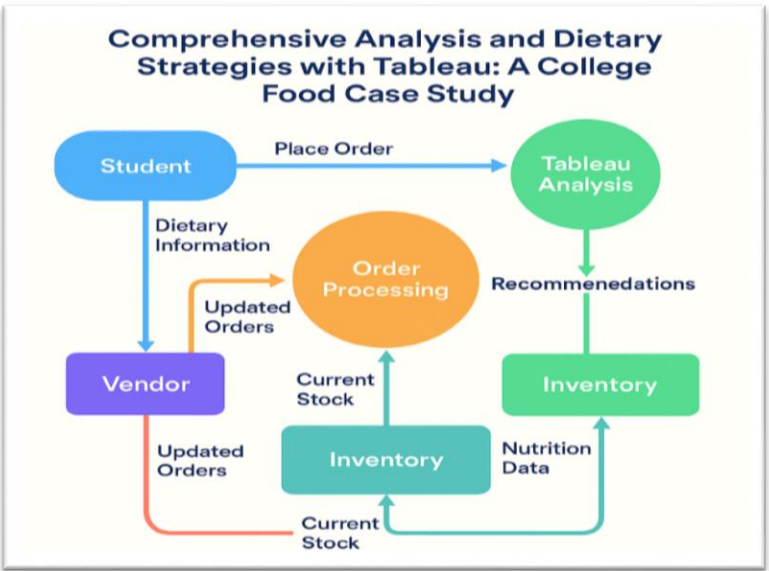
		or narrative step in tools like Tableau.
FR-10	Performance Testing	Load Testing Simulate multiple users or large datasets to test response time & limits Query Performance Analysis Measure query speed, indexing, joins, filters, and aggregations Dashboard Rendering Speed Track how long visualizations take to load/render in Tableau, Power BI Data Refresh/ETL Timing Time taken to extract, transform, and load data (ETL pipelines) Resource Utilization Monitoring Track CPU, memory, disk usage while running queries or dashboards
FR-11	Utilization of Data Filters	1.Remove irrelevant or noisy data females, only high GPA, only 2024 data) exploration by end users2.Focus on specific groups (e.g., only 3. Enable dynamic
FR-12	No of Calculation Fields	<ul style="list-style-type: none">Create new metrics (e.g., BMI = weight/height²) Simplify complex expressions in chartsCategorize or group data logically Customize visualizations and filters
FR-13	No of Visualizations/Graph	Making of different visualizations depending on the different fields
FR-14	Web Integration	Embed Dashboards into Websites: Use iFrames or embed code (e.g., Tableau Public) to show dashboards directly on a webpage Share via Web Links: Publish dashboards to Tableau Server, Public, or Power BI service and share link Create Embedded Portals: Build internal web portals that centralize dashboards and filters for user. Use Tracking and Analytics: Embed Google Analytics or logging scripts to track how users interact with dashboards.
FR-15	Record explanation Video for project end to end solution	<ul style="list-style-type: none">➤ Define Your Objective Decide your goal: showcase insights, explain process, or present to recruiters?➤ Create a Scriptor Storyboard Plan what you'll say for each section (introduction, problem, process, output)➤ Set Up Your Tools Install tools like OBS Studio, Zoom, PowerPoint Recorder.➤ Open All Project Files Open Tableau dashboards, dataset (e.g., Excel/CSV), and any code if applicable➤ Record Voice+Screen Start screen recording with your narration explaining:
FR-16	Project Documentation-Step by step project development procedure	<ul style="list-style-type: none">➤ Project Title Choose a clear, meaningful title (e.g., <i>Comprehensive Dietary Analysis with Tableau</i>)➤ Introduction Write a brief overview of the problem, goal, and why it matters➤ Objective State the aim (e.g., "To analyze eating habits and health patterns of students")➤ Dataset Description Explain the source, format (CSV), size, columns, and what each field represents➤ Data Cleaning Document how you handled missing values, outliers, irrelevant columns➤ Exploratory Data Analysis (EDA) List initial observations using basic charts (counts, averages, etc.)

Non-functional Requirements:
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Students can reflect on their eating and fitness behaviours. Researchers can use visual trends to publish findings on youth nutrition
NFR-2	Security	Remove or mask personal identifiers (e.g., names, student IDs) Ensure that even combined field identifiers
NFR-3	Reliability	Follows visualization and design best practice Includes documentation and transparent insights

3.3 Data Flow Diagram

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



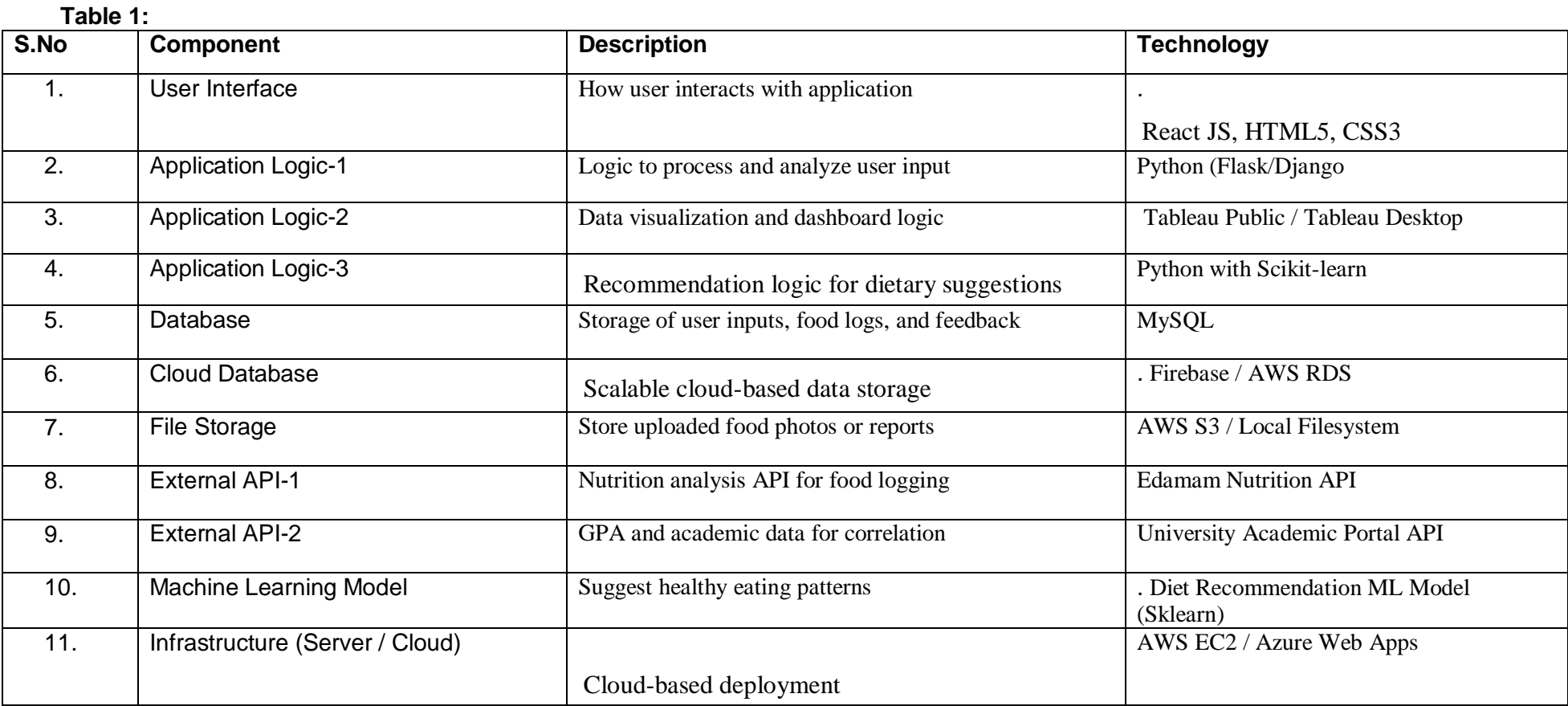
Entities:

- **Customer (External Entity):** The student or college user providing inputs such as food preferences, health data, or placing a food order.
- **Inventory (Data Store):** Contains available food items, ingredients, nutritional information, and stock levels.
- **Tableau Analysis (Process):** The core analytical system that processes and visualizes data.
- **Order Process (Process):** Handles selection, customization, and fulfillment of food orders.

User Stories:

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Student (Mobile User)	Registration	USN-1	. As a user, I can register by entering my name, email, and	I can successfully create and log into an account.	High	sprint 1
	Data Input	USN-2	As a user, I can enter my daily food intake and mood.	I can save and view my input for each day	High	Sprint 2
	Dashboard	USN-3	As a user, I can view visual reports of my food preference	Visualizations are personalized and reflect data	High	Sprint 3
	Diet Suggestion	USN-4	As a user, I can get personalized dietary suggestion GPA	I receive a weekly meal recommendation.	Medium	Sprint 3
	Feedback	USN-5	As a user, I can submit feedback about the food quality or dashboard usability	Feedback is stored and acknowledged.	Medium	Sprint 3
Researcher (Web User)	Dashboard Analytics	USN-6	As a researcher, I can analyze student dietary trends using Tableau dashboards.	I can filter data by gender, GPA, or dietary habit	High	Sprint 1
	Export Report	USN-7	As a researcher, I can export visuals and summary reports for research publications.	Reports are downloadable in PDF and Excel format	Medium	Sprint 2
	Data Comparison	USN-8	As a researcher, I can compare food trends across semesters or department	Comparative charts are generated from historical data.	Medium	Sprint 3
Nutrition Analyst / Admin	Food Inventory Insight	USN-9	As an admin, I can review and moderate data submitted s	I can approve or flag entries that are inconsistent or inappropriate	High	Sprint 1

3.4 Technology Stack
Technical Architecture:



S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Front-end and back-end frameworks	React JS, Flask, Python, MySQL
2.	Security Implementations	Authentication, encryption, access control	O Auth 2.0, SHA-256, HTTPS, Firebase Auth
3.	Scalable Architecture	Expandable across institutions using micro services	3-tier Architecture with Docker
4.	Availability	High availability with distributed architecture	AWS Load Balancer, Multi-Zone Deployment
5.	Performance	Fast rendering and data fetch	CDN, Tableau Extracts, In-memory cache

4.1 Problem Solution Fit

4.2 Proposed Solution

Proposed Solution for the topic: Comprehensive Analysis and Dietary strategies with tableau: A college food case study.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	College students often face issues related to unhealthy dietary habits due to poor food choices, limited nutritional awareness, and stress-related eating. There is a lack of a unified system to analyze and improve their dietary behaviour using real-time data.
2.	Idea / Solution description	The project proposes a Tableau-based interactive dashboard system that aggregates student dietary data, including GPA, meal types, calorie intake, comfort food reasons, and more. The visualizations will reveal hidden trends, support informed food decisions, and help university authorities craft effective dietary strategies
3.	Novelty / Uniqueness	This solution uniquely combines academic performance, emotional food behavior, and nutrition analysis with Tableau's capabilities to present personalized insights and cross-functional analysis in a user-friendly manner.
4.	Social Impact / Customer Satisfaction	By improving awareness of food choices and their consequences, this project can enhance student well-being, reduce obesity and mental health issues, and drive campus-wide initiatives for healthier eating. Students, researchers, and institutions benefit from actionable insights
5.	Business Model (Revenue Model)	The model can be monetized by licensing the dashboard system to universities, wellness centers, and nutrition consultancies. Additional revenue can be generated via workshops, analytics subscriptions, and collaborative research grants
6.	Scalability of the Solution	The solution can scale to multiple campuses and integrate with other datasets like mental health scores, sports activity logs, and wearable device data. The Tableau system can be expanded with real-time mobile input and multi-language support

4.3 Solution Architecture

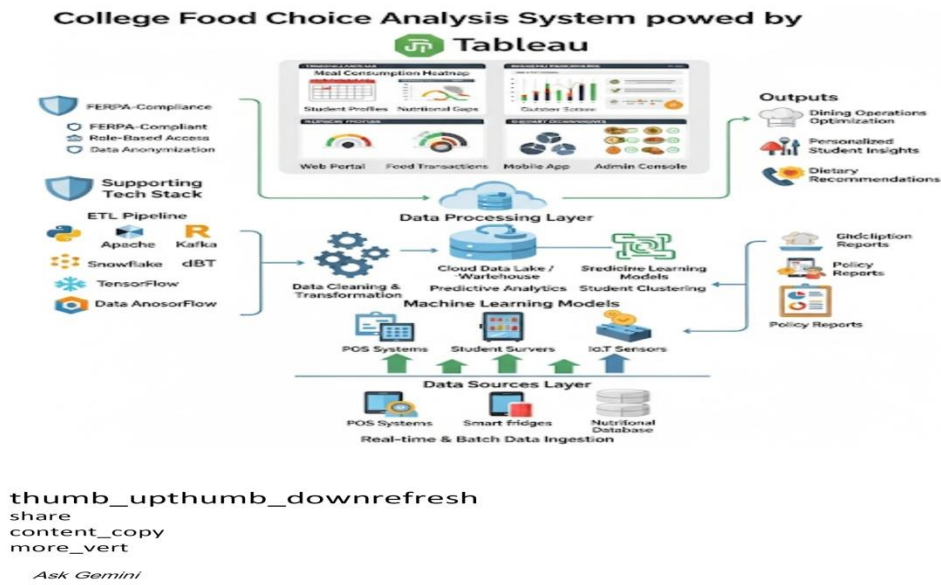


Figure 1: Architecture and data flow of the Comprehensive Analysis and Dietary strategies with tableau: A college food case study.

5. PROJECTPLANNING&SCHEDULING

5.1 Project Planning

6. FUNCTIONALANDPERFORMANCETESTING

6. 1Performance Testing

Model Performance Testing:

S.No.	Parameter	Screenshot / Values
1.	Data Rendered	CSV data from college food preference survey (food_coded.csv) was rendered into Tableau. Dataset Size: 6MB No.of Rows :125 No.of Columns:61

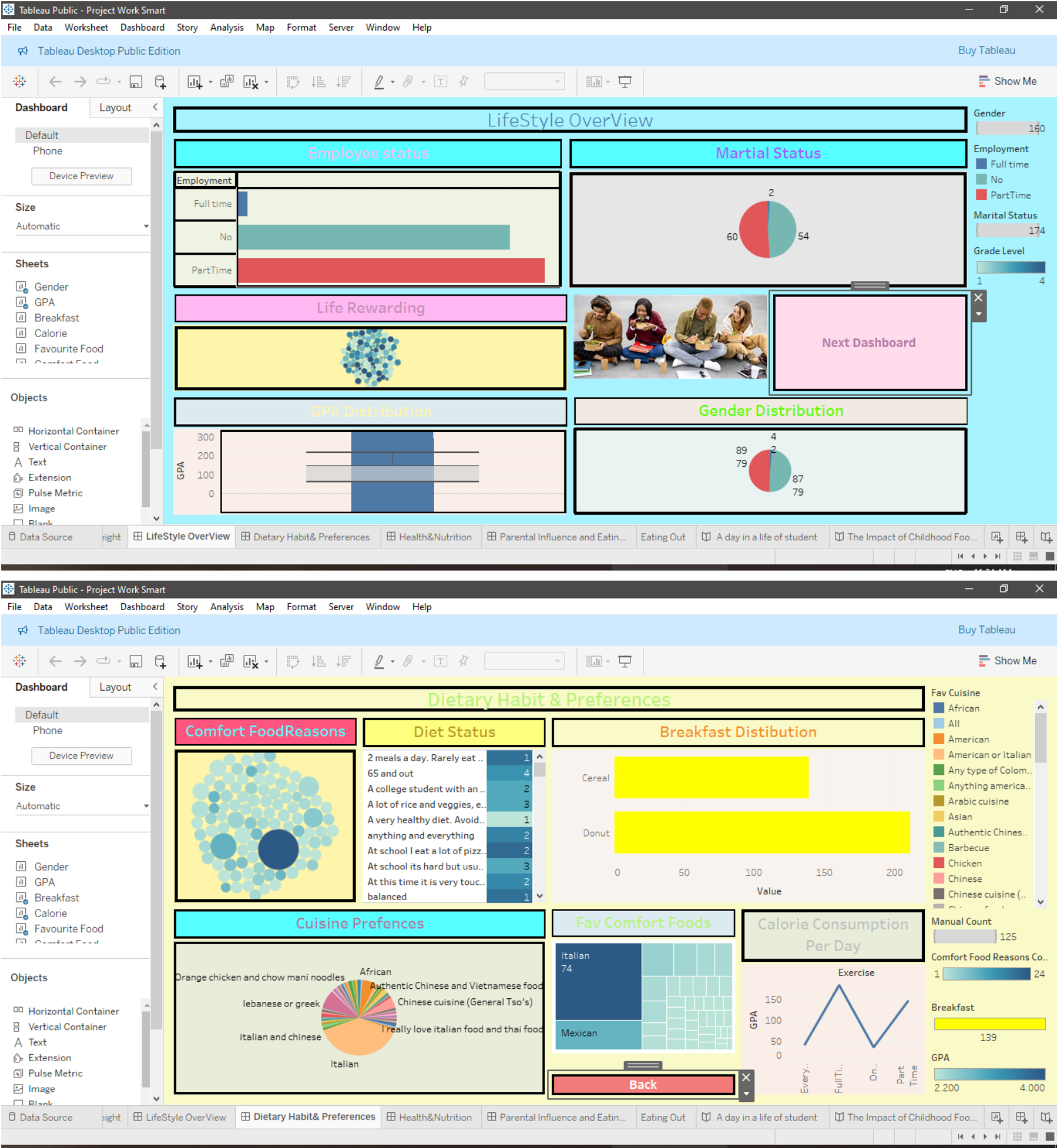
2.	Data Preprocessing	1)Removed null values 2)Standardized categories (e.g., comfort food types). 3)Converted numeric fields (e.g., calorie intake, GPA).
3.	Utilization of Filters	Used : <ul style="list-style-type: none">• Gender• Diet Type / Status• Cooking Frequency• Cuisine Preference• Comfort Food Types• Meal Payment Method• Parental Cooking Habits• Weight Self-Perception• Exercise Frequency• Vitamin Intake• Healthy Feeling• Life Rewarding Rating• Marital Status• Student GPA (using ranges)
4.	Calculation fields Used	Created calculated fields: BMI Category Comfort Food Count Healthy Eating Index.
5.	Dashboard design	No of Visualizations : <div><div></div><div><div>1. GPA Distribution</div><div>2. Gender Distribution</div><div>3. Breakfast distribution</div><div>4. Calorie Consumption per day</div><div>5. Favourite Comfort Foods</div><div>6. Comfort Food Reasons</div><div>7. Cooking Frequency per week</div><div>8. Cuisine Preferences</div><div>9. Diet Status</div><div>10. Exercise Frequency</div><div>11. Employee Status</div><div>12. Healthy Feeling</div><div>13. Life Rewarding Rating</div><div>14. Marital Status</div><div>15. Nutritional Check</div><div>16. Parental Cooking Habits</div><div>17. Meal Payment Habits</div><div>18. Weight Self Perception</div><div>19. Sports Participation</div><div>20. Vitamin Intake</div><div>21. Weight Distribution</div><div>22. Eating out</div><div>23. Coffee Consumption</div></div></div> No.of Dashboards: 1. Responsive and Design of Dashboard : 6 visualizations 2. Dietary Habits and Preferences: 6 Visualizations 3. Health and Nutrition: 5 Visualizations 4. Parental Influence and Eating Out: 3 Visualizations

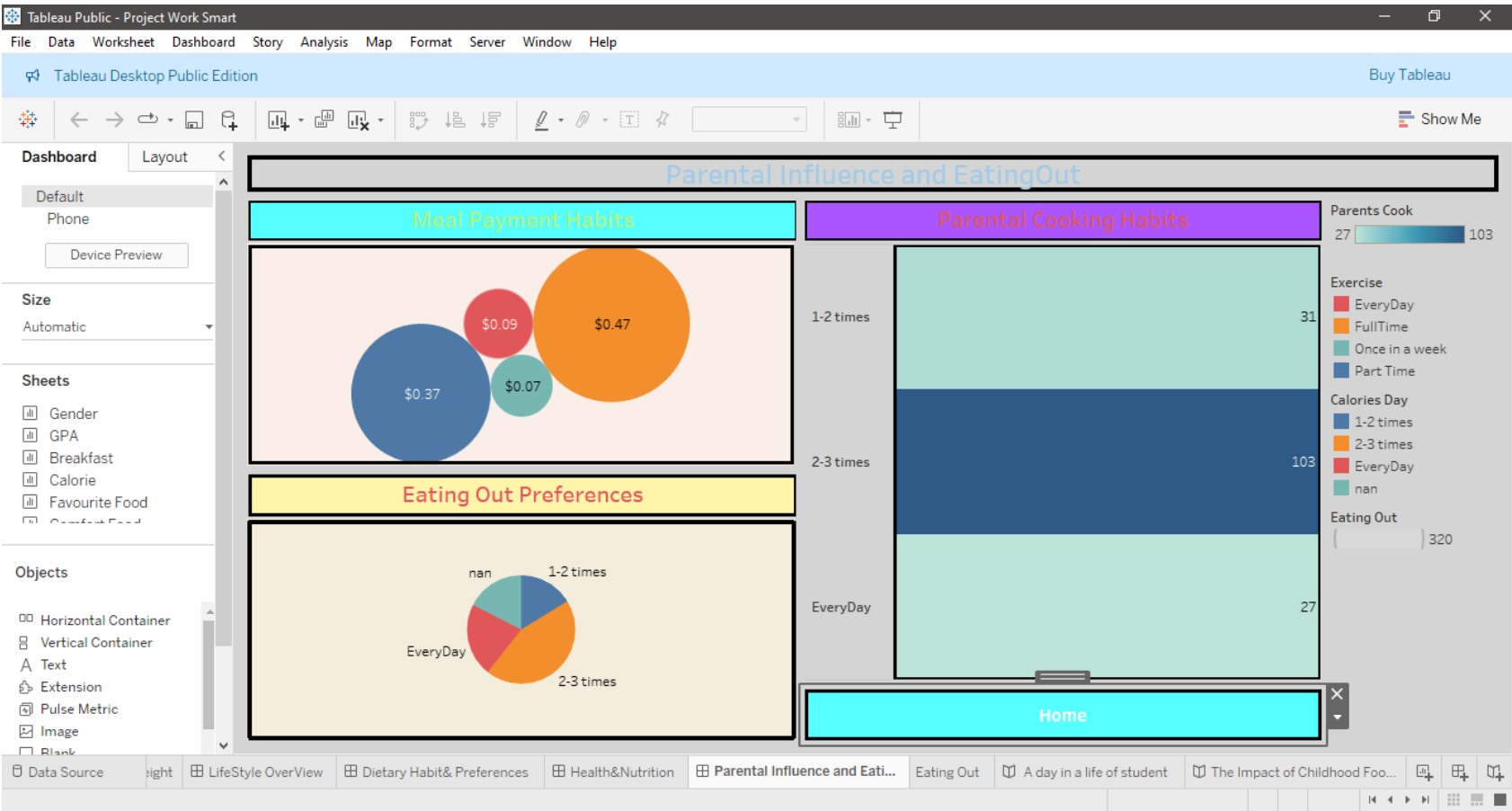
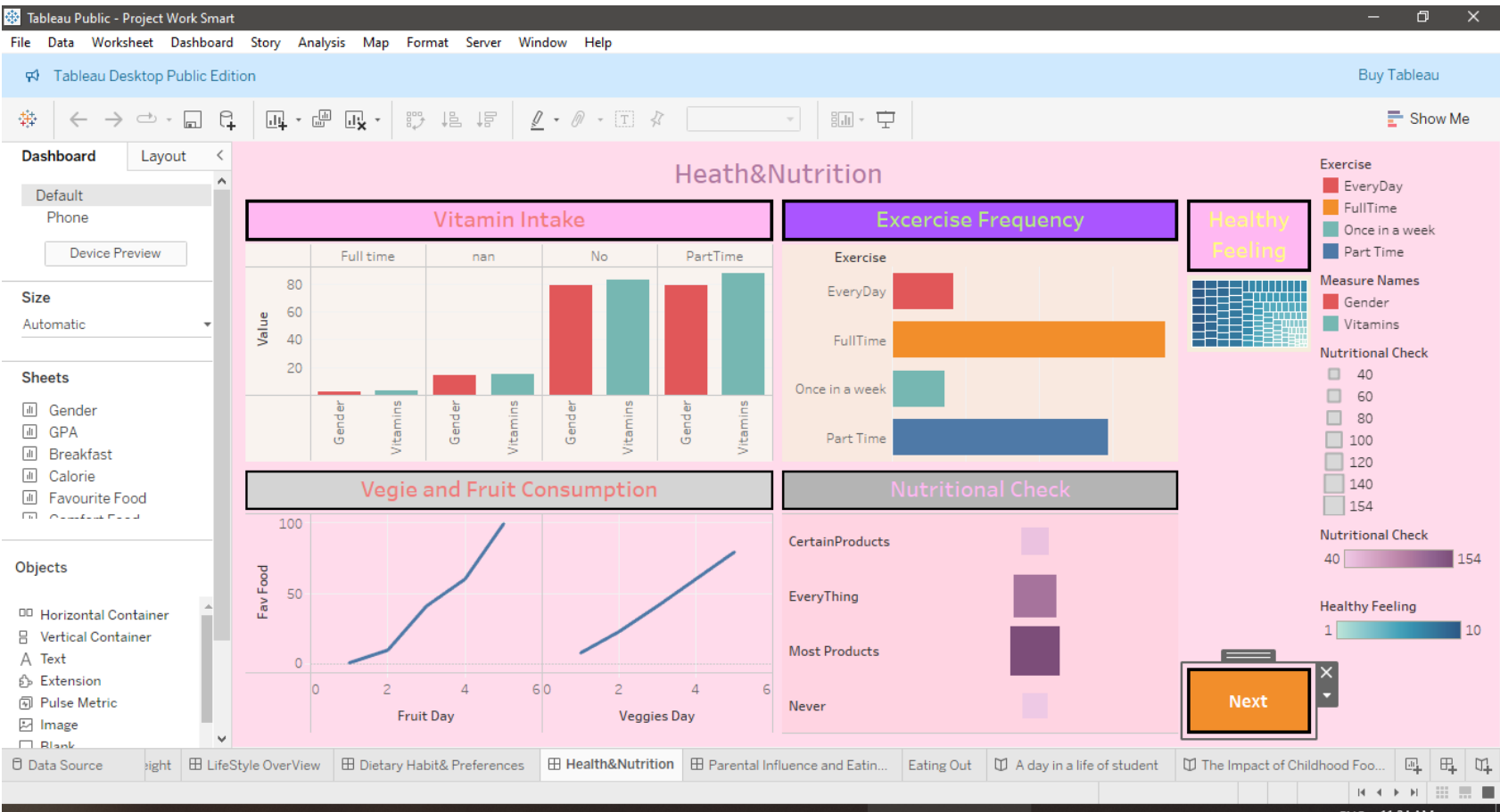
6	Story Design	<div>No of Stories:<div><div>1) A day in a life of Student: 5 Visualizations</div><div><div></div><div></div><div></div><div></div><div></div></div><div>2)The Impact of Childhood Food Preferences on Adult Choices: 4 Visualizations</div><div><div></div><div></div><div></div><div></div></div></div></div>
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7. RESULTS

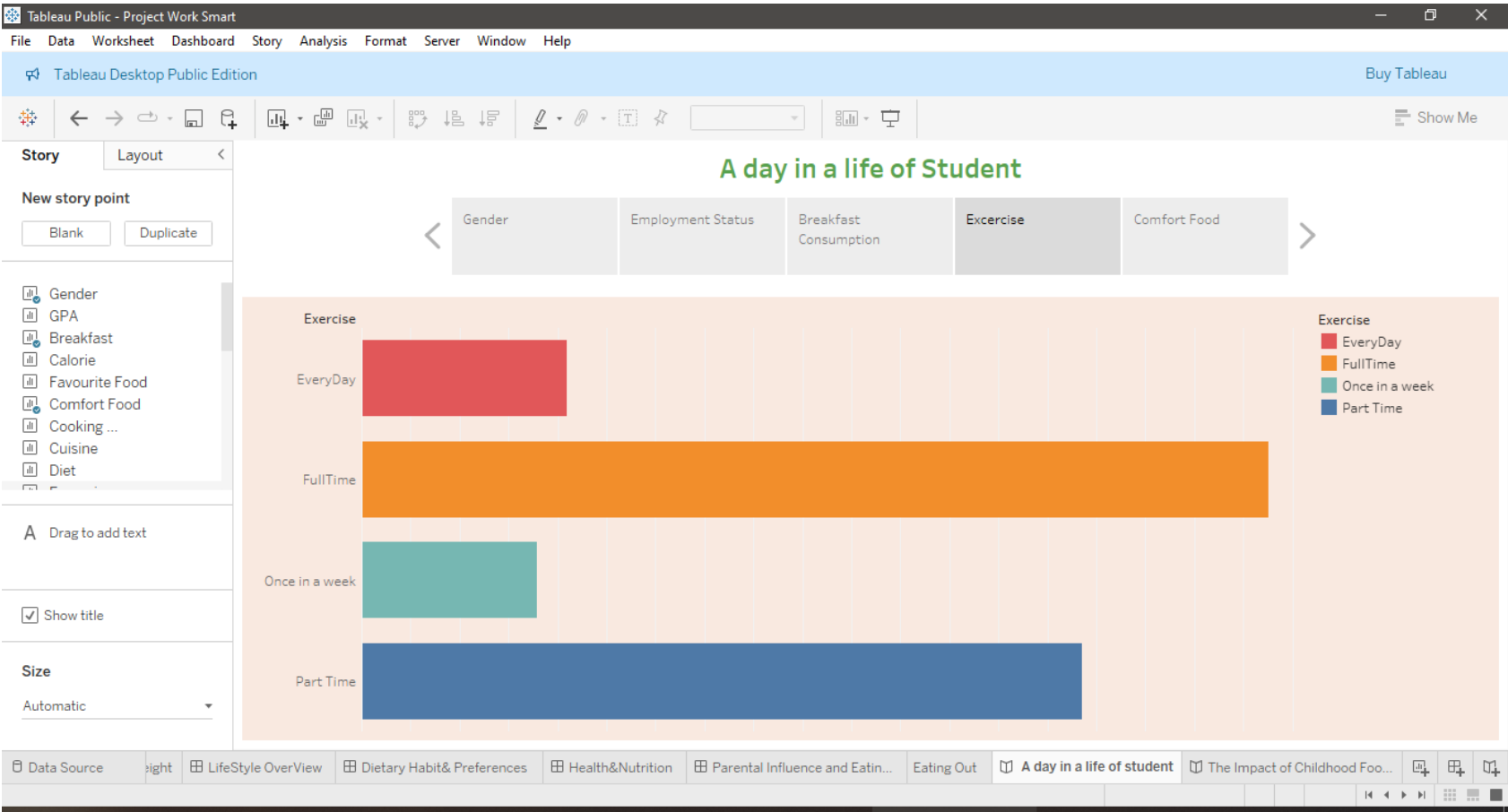
Output Screenshots

DASHBOARD SCREENSHOTS





No.Of Stories





8. **ADVANTAGES & DISADVANTAGES:**

Advantages:

1. **Data-Driven Insights**

- Enables in-depth analysis of students’ food habits, dietary patterns, and nutritional behavior using real-time data visualization.

2. **Visual Clarity with Tableau**

- Tableau provides interactive dashboards that simplify complex data, making patterns and trends easier to understand for all stakeholders.

3. **Identification of Health Trends**

- Helps in identifying issues like low vitamin intake, high junk food preference, or irregular meal timing among students.

4. **Customizable Dietary Strategies**

- Facilitates the creation of personalized diet plans based on student groups (e.g., by gender, exercise level, meal preference)

Disadvantages:

1. **Data Collection Challenges**

- Gathering accurate, consistent, and honest responses from college students can be difficult and time-consuming.

2. **Privacy Concerns**

- Handling sensitive information about eating habits and health without proper anonymization may raise ethical and privacy issues.

3. **Skill Requirements**

- Requires proficiency in Tableau and data analysis, which might be a barrier for non-technical users.

4. **Dynamic Behavior Changes**

- Student food choices can change frequently due to stress, budget, or schedule, making it hard to maintain consistent analysis

9. **CONCLUSION**

- 1.The comprehensive analysis of college food choices using Tableau reveals significant insights into the dietary habits, preferences, and nutritional awareness of students
2. The visual dashboards effectively communicate how demographic elements such as gender, academic stress, and exercise routines influence diet quality and nutritional choices.
3. This study emphasizes the importance of balanced diets and targeted interventions to promote healthier eating behaviors in college environments.
4. The Tableau platform enabled clear identification of gaps—such as low vitamin intake or irregular meal patterns—and suggested strategies to improve student well-being through informed food planning and education.

Overall, this case study demonstrates the power of data analytics in driving awareness, encouraging healthier lifestyles, and supporting decision-makers—such as campus dining services and health counselors—in creating impactful dietary strategies tailored to the needs of

the student population.

10. FUTURESCOPE

The integration of data analytics and visualization in dietary strategy development holds immense promise for shaping healthier college environments. Based on this study, several future directions can be explored:

1. • **Personalized Nutrition Recommendations**
Advanced analytics can be combined with machine learning algorithms to offer personalized meal suggestions tailored to an individual's health profile, dietary preferences, and academic schedule.
2. • **Integration with Real-Time Health Monitoring**
Wearable devices and mobile health apps can be integrated with Tableau dashboards to track calorie intake, physical activity, sleep patterns, and stress levels for real-time feedback and intervention.
3. • **Predictive Modeling for Health Outcomes**
Using historical and demographic data, predictive models can be developed to foresee potential health risks such as obesity, diabetes, or nutritional deficiencies among students.
4. • **Behavioral Pattern Recognition**
Incorporating behavioral data can help identify triggers of unhealthy eating habits (e.g., exam stress, late-night cravings), allowing for the design of targeted educational interventions.
5. • **Scalability to Other Institutions**
The study framework can be adapted for other colleges or universities, enabling benchmarking and comparative studies across different demographics and geographies
6. **Policy-Making and Institutional Planning**
Findings can inform campus food service planning, menu redesign, and policy changes to promote sustainable, nutritious, and culturally inclusive food choices.

11. APPENDIX

Source Code (if any) Dataset Link:

https://www.kaggle.com/datasets/borapajo/food-choices?select=food_coded.csv

Team Git Hub Link : <https://github.com/harshidunthala/Comprehensive-analysis-and-dietary-strategies-with-Tableau-a-college-food-choices-case-study>.

Team Leader Github Link : <https://github.com/harshidunthala/Comprehensive-analysis-and-dietary-strategies-with-Tableau-a-college-food-choices-case-study>.

Team Member Github Link : <https://github.com/shaikabid123/comprehensive-analysis-and-dietary-strategies-with-tableau-a-college-food-choices-case-study>

Video Demo Link: https://drive.google.com/file/d/1ygbMMsi7B06RcC5Zk_4bW_MAfVgFd5Ph/view