ProjectReportofthetopic

Comprehensiveanalysisanddietarystrategieswithtableau:Acollegefoodchoicescasestudy

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1. **INTRODUCTION**

ProjectOverview:

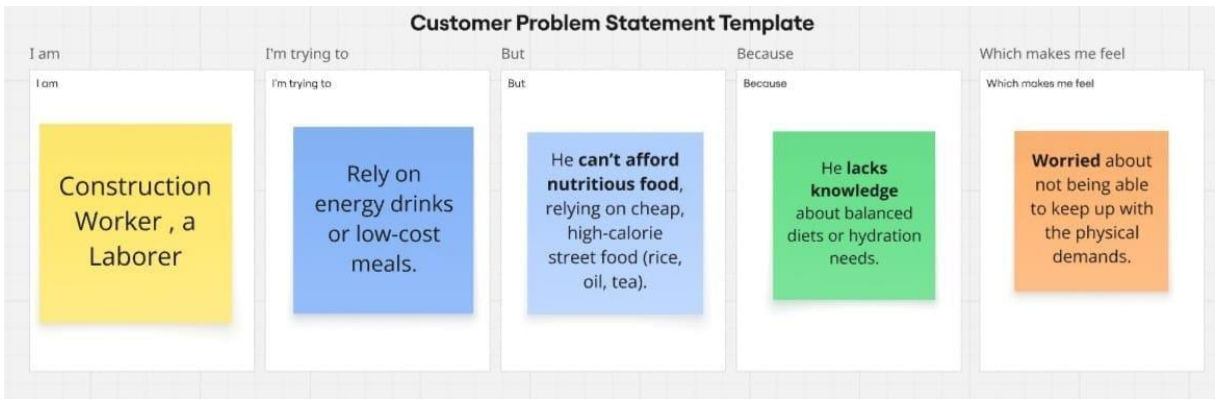
Thisproject, titled**"ComprehensiveAnalysisandDietaryStrategieswithTableau:ACollegeFoodChoicesCaseStudy,"**aimsto explore and understand the food habits, dietary patterns, and nutritional behaviors of college students using interactive data visualization tools. With the rising concern for student wellness and mental health on campuses, analyzing food choices can provide significant insights into their physical health, lifestyle preferences, and potential areas for intervention

Purpose:

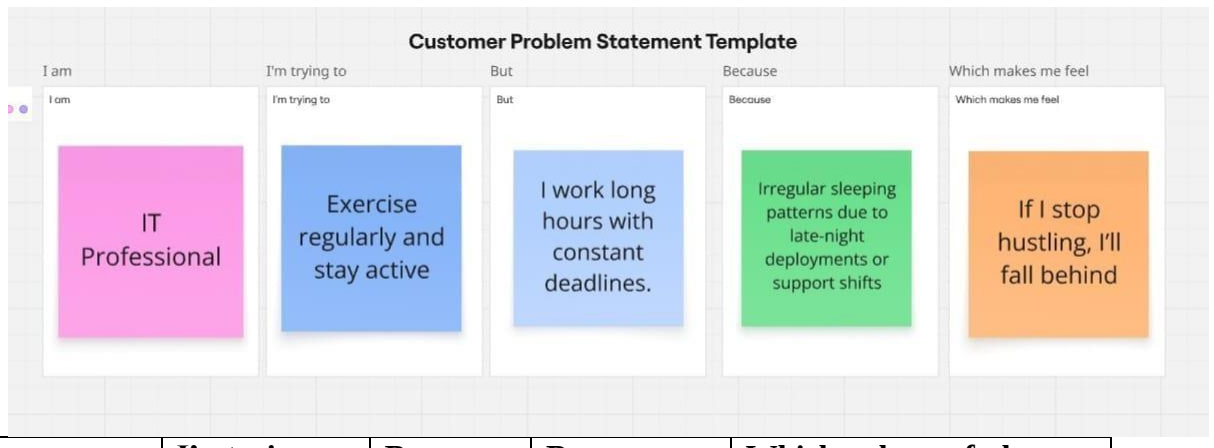
Theprimary purpose of this case study is to conduct a comprehensiveanalysis of collegestudents' food choices and dietary habits using advanced data visualization tools like Tableau. By leveraging real-time data collected from student surveys and behavioral patterns, the study aims to identify nutritional gaps, food preferences, cooking frequency, and health perceptions among students. Throughvisualanalytics, theproject seekstouncover correlationsbetweendiet patternsandlifestylefactorssuchasGPA, exercise frequency, stress levels, and well-being.

2. **IDEATIONPHASE**

ProblemStatement1:

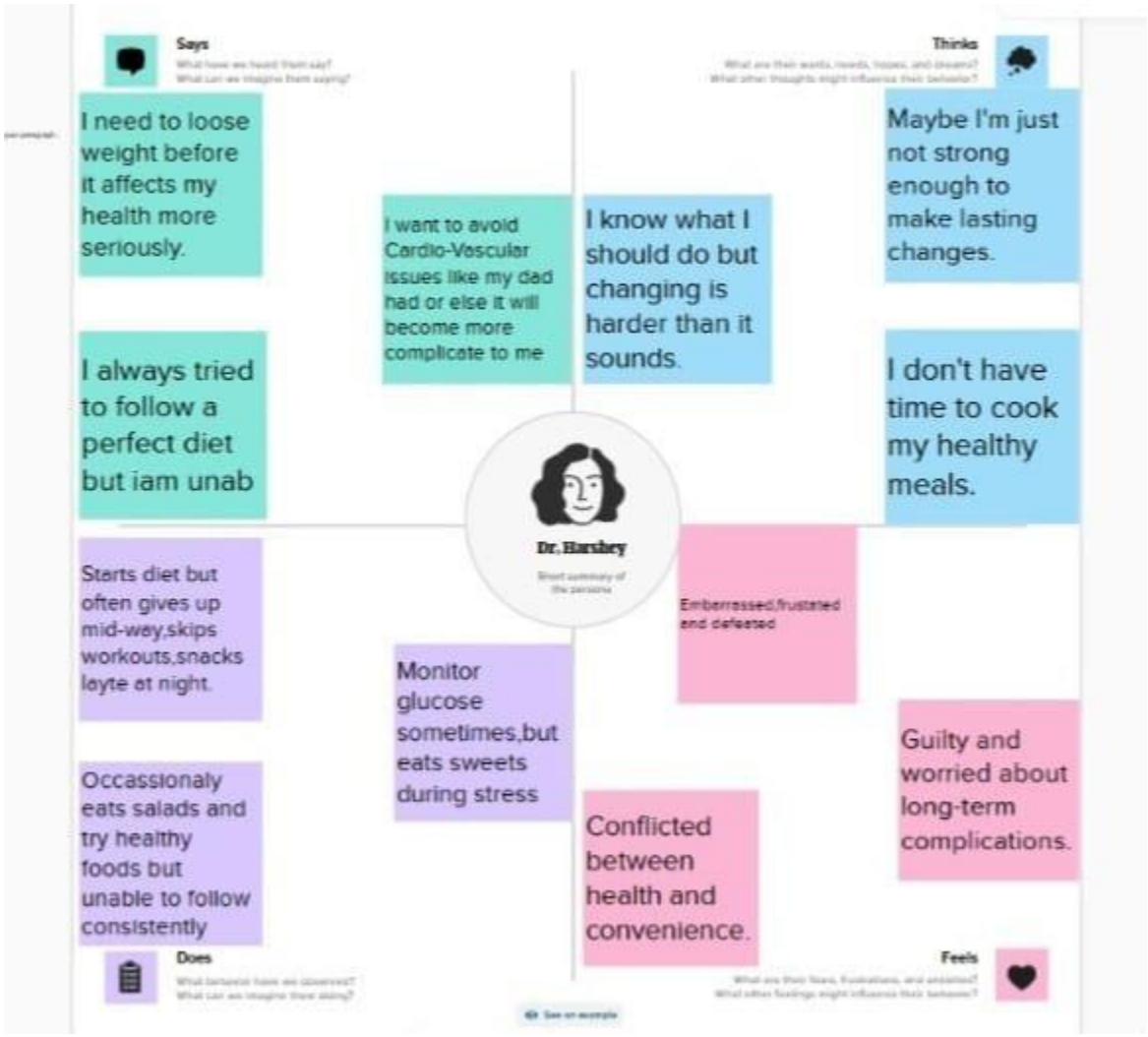


ProblemStatement2:



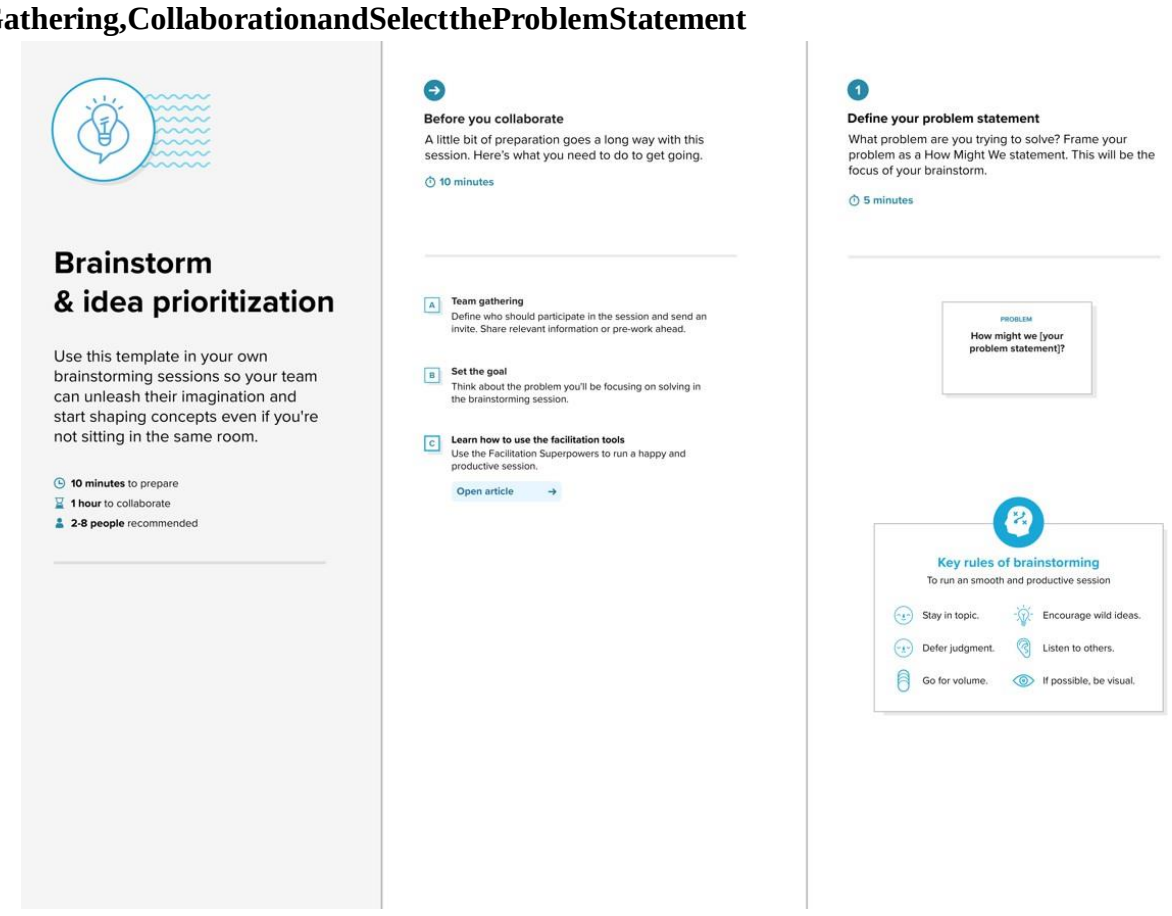
Problem Statement(PS)	I am (Customer)	I'mtryingto	But	Because	Whichmakesmefeel
PS-1	Construction Worker	Rely on energydrinks or low-cost meals	Can'tafford nutritious food,relying on cheap, highcalorie, street food	He lacks knowledge about balancedor hydration needs	Worriedaboutnotbeing able to keep up withthe physical demands.
PS-2	IT Professional	Exercise regularlyand stay active	I work long hours with constant deadlines	Irregular sleeping patterns due to late-night deployments or support shifts	IfIstophustling,I'llfall behind

EmpathyMapCanvas

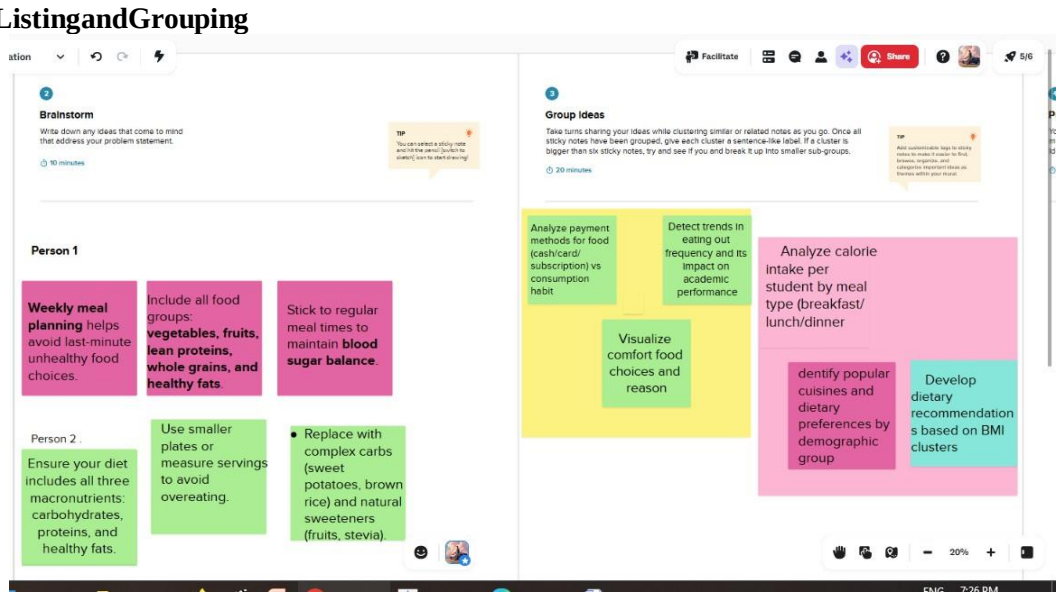


Brainstorming

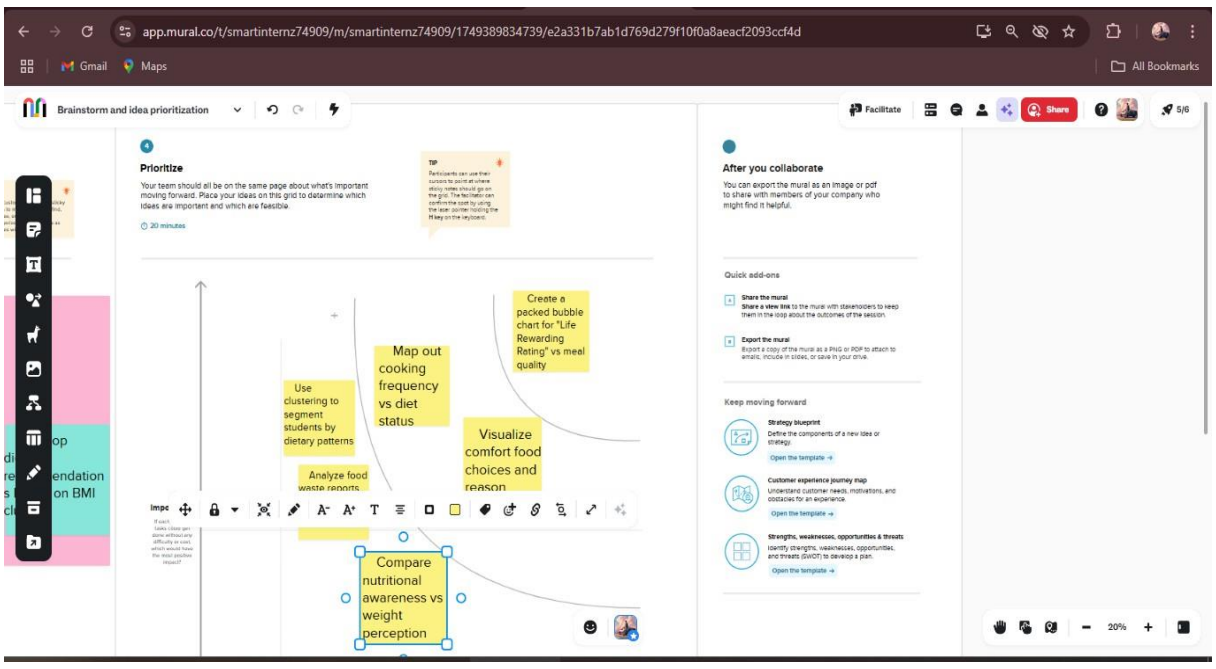
Step-1:TeamGathering,CollaborationandSelecttheProblemStatement



Step-2:Brainstorm,IdeaListingandGrouping

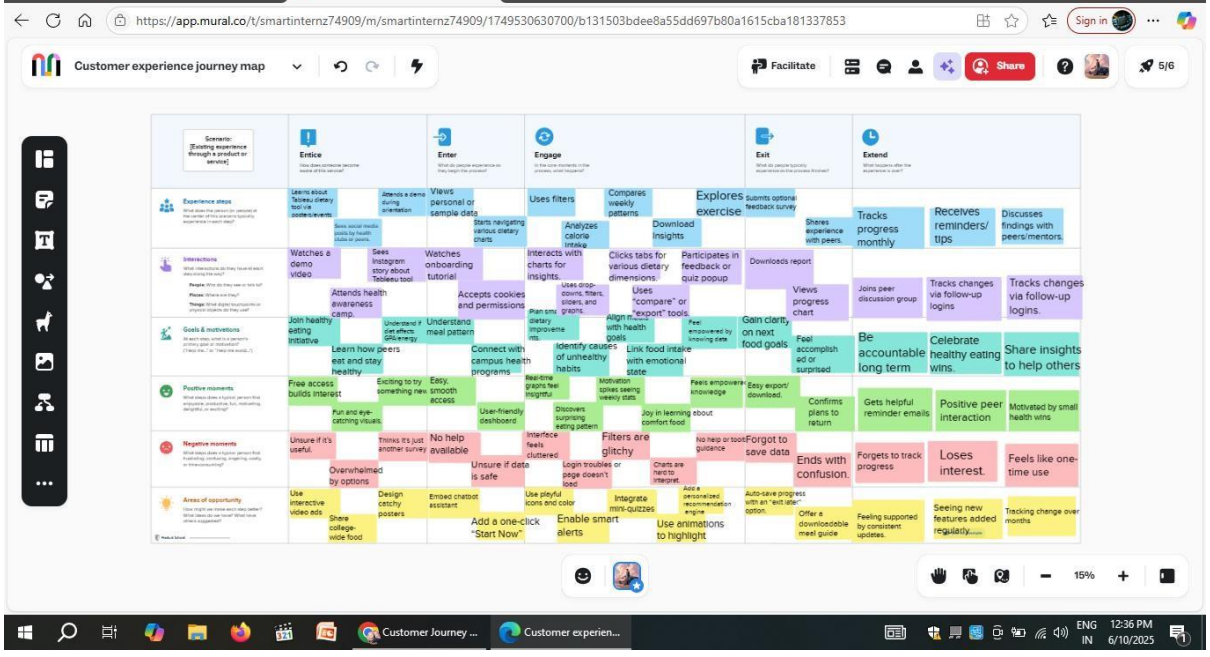


Step-3:IdeaPrioritization



3. **REQUIREMENTANALYSIS**

CustomerJourneymap



SolutionRequirement

FunctionalRequirements:

Followingarethefunctionalrequirementsoftheproposedsolution.

FR No.	FunctionalRequirement(Epic)	SubRequirement(Story/Sub-Task)
FR-1	DataCollection&Extractionfrom Database	Downloadingthedatasetofthetask
FR-2	Collectthedataset	Collectingtherequired datasetforperformingthefollowingtask
FR-3	Connect datawithTableau	Connectingthedatasettothetableaupublicdesktoptoperformvisualizations.
FR-4	DataPreparation	Preparingofthedataset inordertoformvisualizations
FR-4	PreparetheDataforVisualization	Completepreparationofdatasetwhichincludes: 1. Cleaning 2. Pre-Processing 3. Data Interpretation 4. Assigningtherowsandcolumnstothedata
FR-5	Data Visualizations	Withusingthedatasetcreatinginteractivevisualizations
FR-6	NoofUniqueVisualizations	Creatingthefollowingvisualizations: 1. GPADistribution 2. GenderDistribution 3. Breakfast distribution 4. CalorieConsumptionperday 5. FavouriteComfortFoods 6. ComfortFoodReasons 7. CookingFrequencyperweek 8. Cuisine Preferences 9. DietStatus 10. ExerciseFrequency 11. EmployeeStatus 12. HealthyFeeling 13. LifeRewarding Rating 14. Marital Status 15. NutritionalCheck 16. ParentalCookingHabits 17. Meal PaymentHabits 18. WeightSelfPerception 19. SportsParticipation 20. VitaminIntake 21. Weight Distribution 22. Eating out 23. CoffeeConsumption
FR-8	ResponsiveandDesignof Dashboard	Creating**well-designed,user-friendly,andinteractiveinterface**thatadjustsintelligentlyto differentscreensizes,userneeds,anddata insights
FR-9	NoofScenes ofStory	Creationof**distinctvieworvisualsegment**ofyour story—typically, each**dashboard tab**

		or **narrativestep**intoolslikeTableau.
FR-10	PerformanceTesting	**Load Testing** Simulatemultipleusersorlarge datasetstotest responsetime&limits **Query Performance Analysis** Measure query speed, indexing,joins,filters,and aggregations **Dashboard Rendering Speed** Trackhowlongvisualizations taketoload/renderinTableau, Power BI **Data Refresh/ETL Timing** Time taken to extract, transform,andloaddata(ETL pipelines) **Resource Utilization Monitoring** Track CPU, memory, disk usagewhilerunningqueries or dashboards
FR-11	Utilizationof DataFilters	1.Remove irrelevant or noisy data 2.Focusonspecificgroups(e.g.,only females, only high GPA, only 2024 data) 3. Enable dynamic exploration by end users
FR-12	NoofCalculationFields	• Create new metrics (e.g., BMI = weight/height²) •Categorizeorgroupdatalogically Simplify complex expressions in charts Customize visualizations and filters
FR-13	NoofVisualizations/Graph	Makingofdifferentvisualizationsdependingonthedifferentfields
FR-14	WebIntegration	EmbedDashboardsintoWebsites:UseiFrames or embedcode(e.g.,TableauPublic)toshow dashboards directly on a webpage Sharevia WebLinks:PublishdashboardstoTableauServer,Public,or Power BIserviceand share link CreateEmbeddedPortals:Buildinternalwebportalsthatcentralizedashboardsandfiltersfor user. UseTrackingandAnalytics:EmbedGoogleAnalytics or loggingscriptstotrackhowusers interact with dashboards.
FR-15	RecordexplanationVideoforproject end to end solution	➢ **DefineYourObjective** Decideyourgoal:showcaseinsights,explainprocess,orpresentto recruiters? ➢ **CreateaScriptor Storyboard** Planwhatyou'llsayforeachsection(introduction,problem, process,output) ➢ **SetUpYour Tools** InstalltoolslikeOBSStudio,Zoom,PowerPointRecorder. ➢ **OpenAllProjectFiles** OpenTableaudashboards,dataset(e.g.,Excel/CSV),andany codeifapplicable ➢ **Record Voice+Screen** Startscreenrecordingwithyour narrationexplaining:
FR-16	ProjectDocumentation-Stepbystep project development procedure	➢ **Project Title** Chooseaclear,meaningfultitle(e.g., *Comprehensive Dietary Analysis with Tableau*) ➢ **Introduction** Writeabriefoverviewoftheproblem,goal,andwhyit matters ➢ **Objective** Statetheaim(e.g.,"To analyzeeating habitsand health patterns of students") ➢ **Dataset Description** Explainthesource,format (CSV),size,columns,and whateachfieldrepresents ➢ **Data Cleaning** Documenthowyouhandledmissingvalues,outliers, irrelevant columns ➢ **ExploratoryDataAnalysis (EDA)** Listinitialobservationsusingbasiccharts (counts,averages,etc.)

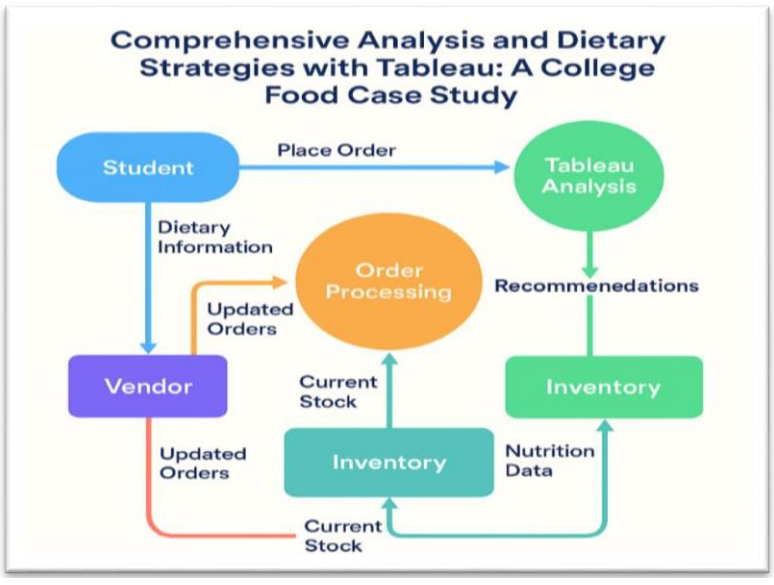
Non-functionalRequirements:

Followingarethenon-functionalrequirementsoftheproposedsolution.

FR No.	Non-FunctionalRequirement	Description
NFR-1	**Usability**	**Students**canreflectontheireatingandfitness behaviours. **Researchers** canusevisualtrendstopublishfindingsonyouthnutrition
NFR-2	**Security**	Removeormaskpersonalidentifiers(e.g.,names,studentIDs) Ensurethatevencombined fieldidentifiers
NFR-3	**Reliability**	Followsvisualizationanddesignbestpractice Includesdocumentationandtransparentinsights

DataFlowDiagram

A DataFlowDiagram (DFD)isatraditionalvisualrepresentationof theinformationflows withinasystem.A neat andclear DFDcandepict 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(ExternalEntity)**:Thestudentorcollegeuserproviding inputssuchas foodpreferences, healthdata,orplacing a food order.
- **Inventory(DataStore)**:Containsavailable fooditems,ingredients,nutritionalinformation,andstocklevels.
- **TableauAnalysis(Process)**:Thecoreanalyticalsystemthatprocessesandvisualizesdata.
- **OrderProcess(Process)**:Handlesselection,customization,andfulfillmentoffoodorders.

User Stories:

UserType	Functional Requirement (Epic)	User Story Number	UserStory/Task	Acceptancecriteria	Priority	Release
Student(Mobile User	Registration	USN-1	. Asauser, Icanregisterbyenteringmyname, email,and	Icansuccessfullycreateand log into an account.	High	sprint1
	Data Input	USN-2	Asauser,Icanentermydailyfoodintakeandmood.	Icansaveandviewmy input for each day	High	Sprint2
	Dashboard	USN-3	Asa user,Icanviewvisualreportsofmyfoodpreference	Visualizations are personalizedandreflectdata	High	Sprint3
	DietSuggestion	USN-4	Asauser,Icangetpersonalized dietarysuggestionGPA	Ireceiveaweeklymeal recommendation.	Medium	Sprint3
	Feedback	USN-5	Asa user,Icansubmitfeedbackaboutthefoodqualityor dashboard usability	Feedbackisstoredand acknowledged.	Medium	Sprint3
Researcher (WebUser	Dashboard Analytics	USN-6	Asaresearcher, Icananalyzestudentdietarytrendsusing Tableaudashboards.	Icanfilterdatabygender, GPA,ordietaryhabit	High	Sprint1
	ExportReport	USN-7	Asaresearcher,Icanexportvisualsandsummaryreportsfor research publications.	Reportsaredownloadablein PDF and Excel format	Medium	Sprint2
	Data Comparison	USN-8	Asaresearcher,Icancomparefoodtrendsacrosssemesters or department	Comparative charts are generatedfromhistorical data.	Medium	Sprint3
Nutrition Analyst/Admin	FoodInventory Insight	USN-9	Asanadmin,Icanreviewandmoderatedatasubmitteds	Icanapproveorflagentries that are inconsistent or inappropriate	High	Sprint1

TechnologyStack

TechnicalArchitecture:

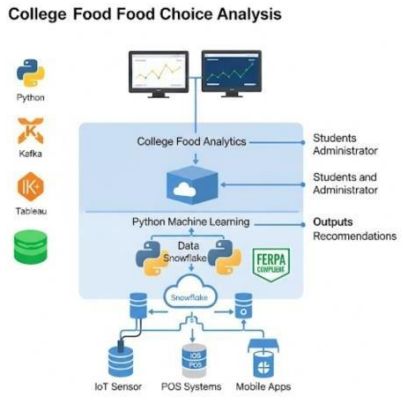


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Table1:

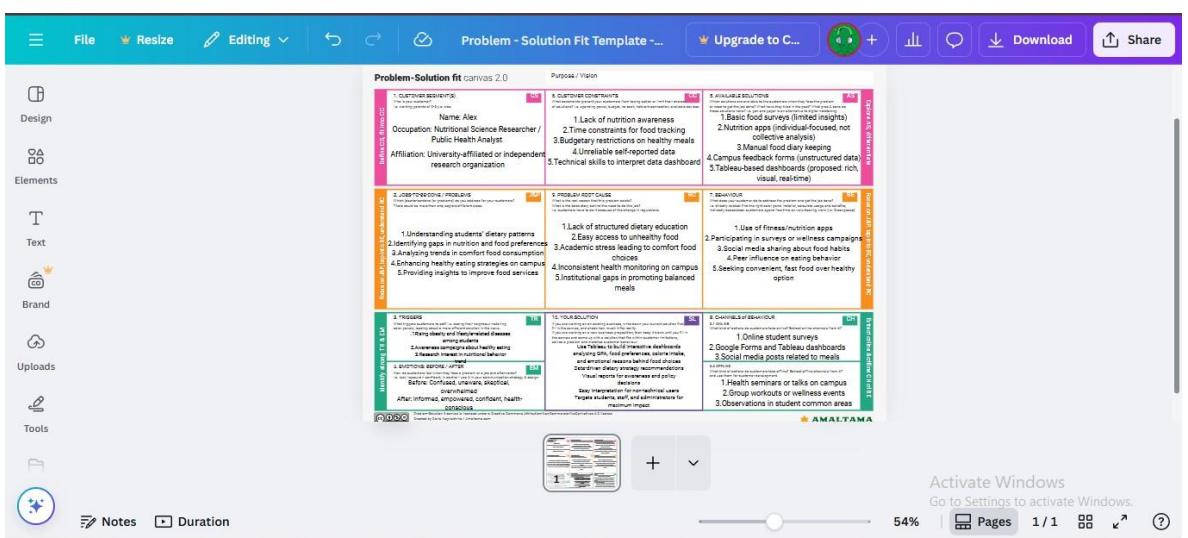
S.No	Component	Description	Technology
1.	User Interface	Howuser interactswithapplication	. ReactJS,HTML5,CSS3
2.	ApplicationLogic-1	Logictoprocessandanalyzeuserinput	Python(Flask/Django
3.	ApplicationLogic-2	Datavisualizationanddashboardlogic	TableauPublic/TableauDesktop
4.	ApplicationLogic-3	Recommendationlogic fordietarysuggestions	PythonwithScikit-learn
5.	Database	Storageofuser inputs,foodlogs,andfeedback	MySQL
6.	CloudDatabase	Scalablecloud-baseddata storage	.Firebase/ AWSRDS
7.	FileStorage	Storeuploadedfoodphotosorreports	AWS S3/LocalFilesystem
8.	ExternalAPI-1	Nutritionanalysis APIforfoodlogging	EdamamNutritionAPI
9.	ExternalAPI-2	GPAandacademicdataforcorrelation	UniversityAcademicPortalAPI
10.	MachineLearningModel	Suggesthealthyeatingpatterns	.DietRecommendationMLModel (Sklearn)
11.	Infrastructure(Server/Cloud)	Cloud-baseddeployment	AWS EC2/AzureWebApps

Table-2:ApplicationCharacteristics:

S.No	Characteristics	Description	Technology
1.	Open-SourceFrameworks	Front-endandback-endframeworks	ReactJS,Flask,Python, MySQL
2.	SecurityImplementations	Authentication,encryption,accesscontrol	OAuth2.0,SHA-256, HTTPS,Firebase Auth
3.	ScalableArchitecture	Expandableacrossinstitutionsusingmicroservices	3-tierArchitecturewithDocker
4.	Availability	Highavailabilitywithdistributedarchitecture	AWSLoadBalancer,Multi-Zone Deployment
5.	Performance	Fastrenderinganddata fetch	CDN,TableauExtracts,In-memorycache

4. PROJECTDESIGN

ProblemSolution Fit



ProposedSolution

ProposedSolutionforthetopic: ComprehensiveAnalysisandDietarystrategieswithtableau:Acollegefoodcasestudy.

S.No.	Parameter	Description
1.	ProblemStatement(Problemtobe solved)	College students often face issues related to unhealthydietary habits due to poor food choices, limited nutritional awareness, and stress-related eating. There is a lack of a unifiedsystemtoanalyzeandimprovetheirdietarybehaviour using real-time data.
2.	Idea/Solutiondescription	TheprojectproposesaTableau-basedinteractive dashboardsystemthataggregatesstudentdietarydata, includingGPA,mealtypes,calorieintake,comfortfood reasons,andmore.Thevisualizationswillrevealhidden trends,supportinformedfooddecisions,andhelp universityauthoritiescrafteffectivedietarystrategies
3.	Novelty/Uniqueness	This solution uniquely combines academic performance, emotional food behavior,andnutritionanalysisinauser-friendly Tableau'scapabilitiestopresentpersonalizedinsightsandcross-functional an
4.	SocialImpact/CustomerSatisfaction	By improving awareness of food choices and their consequences,thisprojectcanenhancestudentwell-being, reduce obesity and mental health issues, and drive campus-wide initiatives for healthier eating. Students, researchers, andinstitutions benefit from actionableinsights
5.	BusinessModel(RevenueModel)	The model can be monetized by licensing the dashboard system to universities, wellness centers, and nutrition consultancies. Additional revenue can be generated via workshops,analyticssubscriptions,andcollaborativeresearch grants
6.	ScalabilityoftheSolution	Thesolutioncanscaletomultiplecampusesand integratewith otherdatasetslikementalhealth scores, sportsactivitylogs,andwearabledevicedata.The Tableausystemcanbeexpandedwithreal-timemobile inputandmulti-languagesupport

SolutionArchitecture

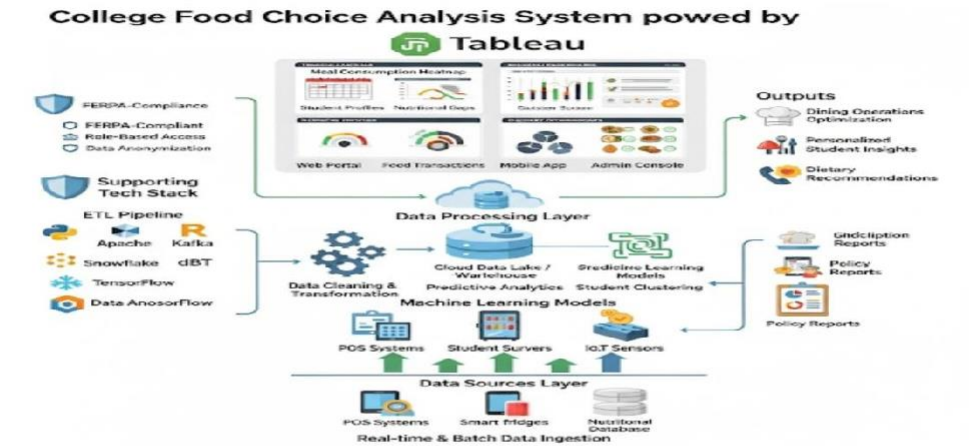


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Figure 1: Architecture anddataflowofthe

ComprehensiveAnalysisandDietarystrategieswithtableau:Acollegefood case study.

5. PROJECTPLANNING&SCHEDULING

Project Planning

Product Backlog,SprintSchedule,andEstimation(4Marks)

Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement(Epic)	UserStory Number	UserStory/Task	StoryPoints	Priority	Team Members

Sprint-1	DataCollection&Cleaning	USN-1	.Asauser,Icanimportandcleancollegefood choice data from survey datasets	3	High	Member1
Sprint1	DataStructuring	USN-2	Asauser,Icancategorizedatabyfieldslike Cuisine Preference, Calorie Count, etc.	2	High	Member1
Sprint2	VisualizationSetup	USN-3	Asauser,IcancreatechartslikeGPAvs. Diet Status, Comfort Food Reasonsusing Tableau	3	High	Member1
Sprint2	Interactive Dashboard	USN-4	Asauser,Icanfilter visualizationsbased ongender,frequency,cookinghabits,etc.	3	Medium	Member1
Sprint3	Analysis& Insights	USN-5	Asauser,Icananalyzedietimpactonstudent well-being using visual patterns	4	High	Member2
Sprint3	Recommendation System	USN-6	Asauser,Icanviewpersonalizeddietary recommendationsbasedonstudentgroup profiles	3	Medium	Member2
Sprint4	ReportGeneration	USN-7	Asauser,Icanexport visualsandinsights	2	Medium	Member2

Sprint	Functional Requirement(Epic)	UserStory Number	UserStory/Task	StoryPoints	Priority	Team Members
			intoasummarizedreport			
Sprint4	FinalPresentation	USN-8	Asauser,IcanviewthecompleteTableau story for presentation to stakeholders	2	Medium	Member2

ProjectTracker,Velocity&BurndownChart:(4Marks)

Sprint	TotalStory Points	Duration	SprintStartDate	SprintEndDate (Planned)	StoryPoints Completed (as on PlannedEndDate)	SprintReleaseDate (Actual)
Sprint-1	5	3 Days	172025	192025	5	19June2025
Sprint-2	6	3 Days	20 2025	222025	6	22June2025
Sprint-3	7	3 Days	232025	24 2025	6	24June2025
Sprint-4	4	3 Days	252025	26 2025	6	26June2025

Velocity:

Imagine we have a10-day sprintduration,and the velocityof the teamis23 (pointspersprint).Let's calculatetheteam's average velocity(AV)per iteration unit (story points per day)

AV=SprintDuration/Velocity

TotalStoryPointsCompleted= 5+6+6+6=23points

TotalSprintDays=3+3+2+2=10 days

Velocity=23storypoints/10days

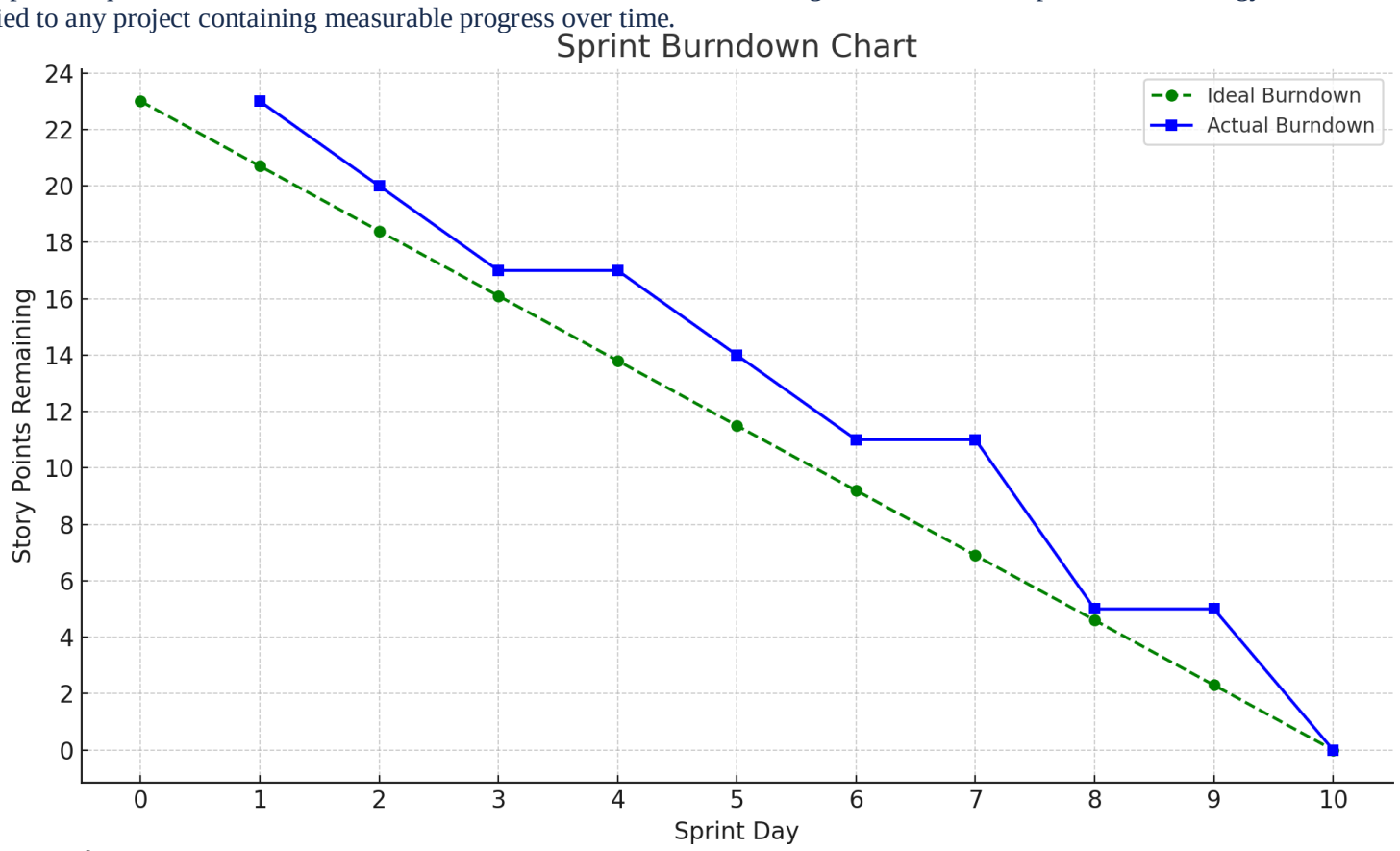
= 2.3story points/day

FinalAnswer:

TeamVelocity=2.3 storypointsperday

BurndownChart:

A burndownchart is a graphical representation of work left to do versus time.It is often used in agile software development methodology such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.



Here's the **BurndownChart** for your project:

- **Green dashed line**: Ideal progress assume in steady velocity of 2.3storypoints/day.
- **Blue line**: Actual progress based on your sprint completions.

The chart shows that our team maintained a consistent pace and slightly out performed the ideal velocity near the end.

6. FUNCTIONALANDPERFORMANCETESTING

6.1PerformanceTesting

ModelPerformanceTesting:

S.No.	Parameter	Screenshot/Values
1.	DataRendered	CSVdatafromcollegefoodpreferencesurvey(`food_coded.csv`)wasrendered into Tableau. Dataset Size: 6MB No.ofRows:125 No.of Columns:61
2.	DataPreprocessing	1) Removednullvalues 2) Standardized categories (e.g., comfort food types). 3)Convertednumericfields(e.g.,calorieintake,GPA).

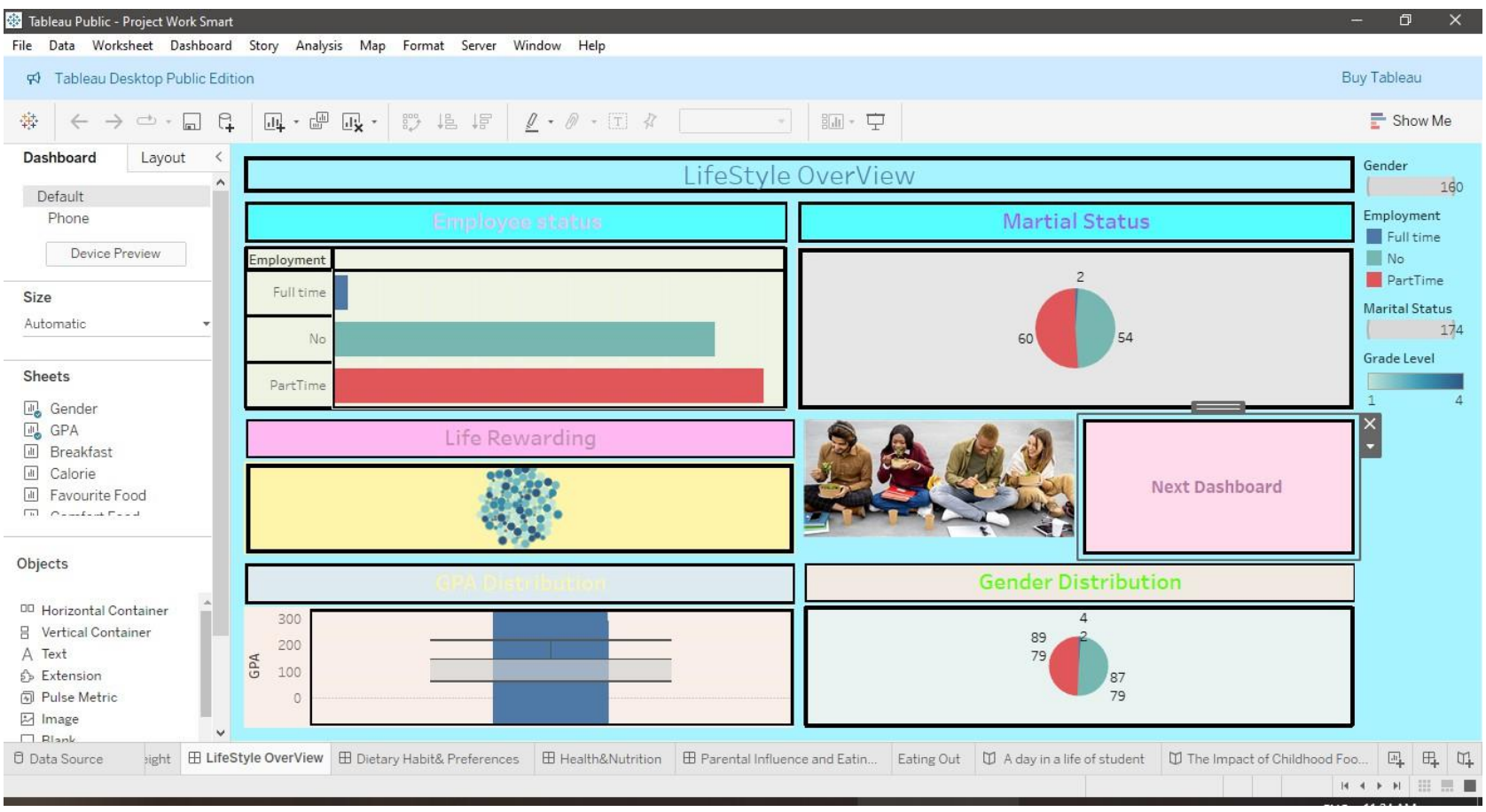
<table>
<tr><td>3.</td><td>UtilizationofFilters</td><td>Used:
Gender
DietType/ Status
Cooking Frequency
CuisinePreference
ComfortFood Types
MealPayment Method
ParentalCooking Habits
WeightSelf-Perception
ExerciseFrequency
VitaminIntake
Healthy Feeling
LifeRewardingRating
MaritalStatus
StudentGPA(usingranges)</td></tr>
<tr><td>4.</td><td>CalculationfieldsUsed</td><td>Createdcalculatedfields: BMI
Category
ComfortFoodCount
HealthyEatingIndex.</td></tr>
<tr><td>5.</td><td>Dashboarddesign</td><td>NoofVisualizations:
GPADistribution
GenderDistribution
Breakfastdistribution
CalorieConsumptionperday
FavouriteComfort Foods
ComfortFoodReasons
CookingFrequencyperweek
CuisinePreferences
DietStatus
ExerciseFrequency
EmployeeStatus
HealthyFeeling
Life RewardingRating
Marital Status
NutritionalCheck
ParentalCookingHabits
MealPaymentHabits
WeightSelfPerception
SportsParticipation
VitaminIntake
WeightDistribution
Eatingout
CoffeeConsumption
No.ofDashboards:
1. ResponsiveandDesignofDashboard:6visualizations
2. DietaryHabitsandPreferences:6Visualizations
3. HealthandNutrition:5Visualizations
4. ParentalInfluenceandEatingOut:3Visualizations</td></tr>
</table>

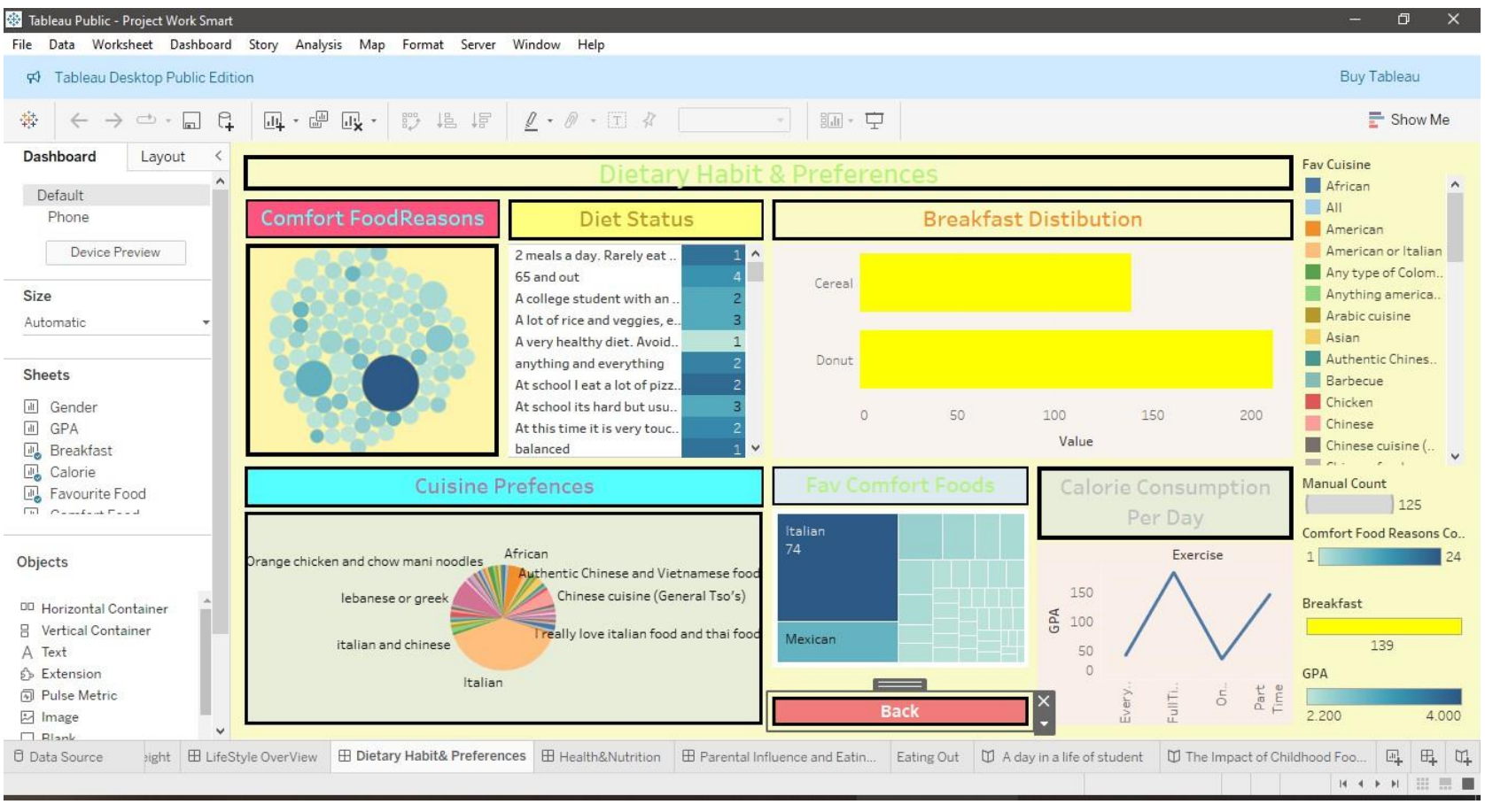
6	StoryDesign	Noof Stories: **1) AdayinalifeofStudent:5Visualizations** • GenderDistribution • BreakfastConsumption • CoffeeConsumption • Exercise • EmploymentStatus **2)The Impact of Childhood Food Preferences on Adult Choices:** **4 Visualizations** • CusinieStudentsGrew • ComfortFood • NutritionalCheck • Healthy Feeding

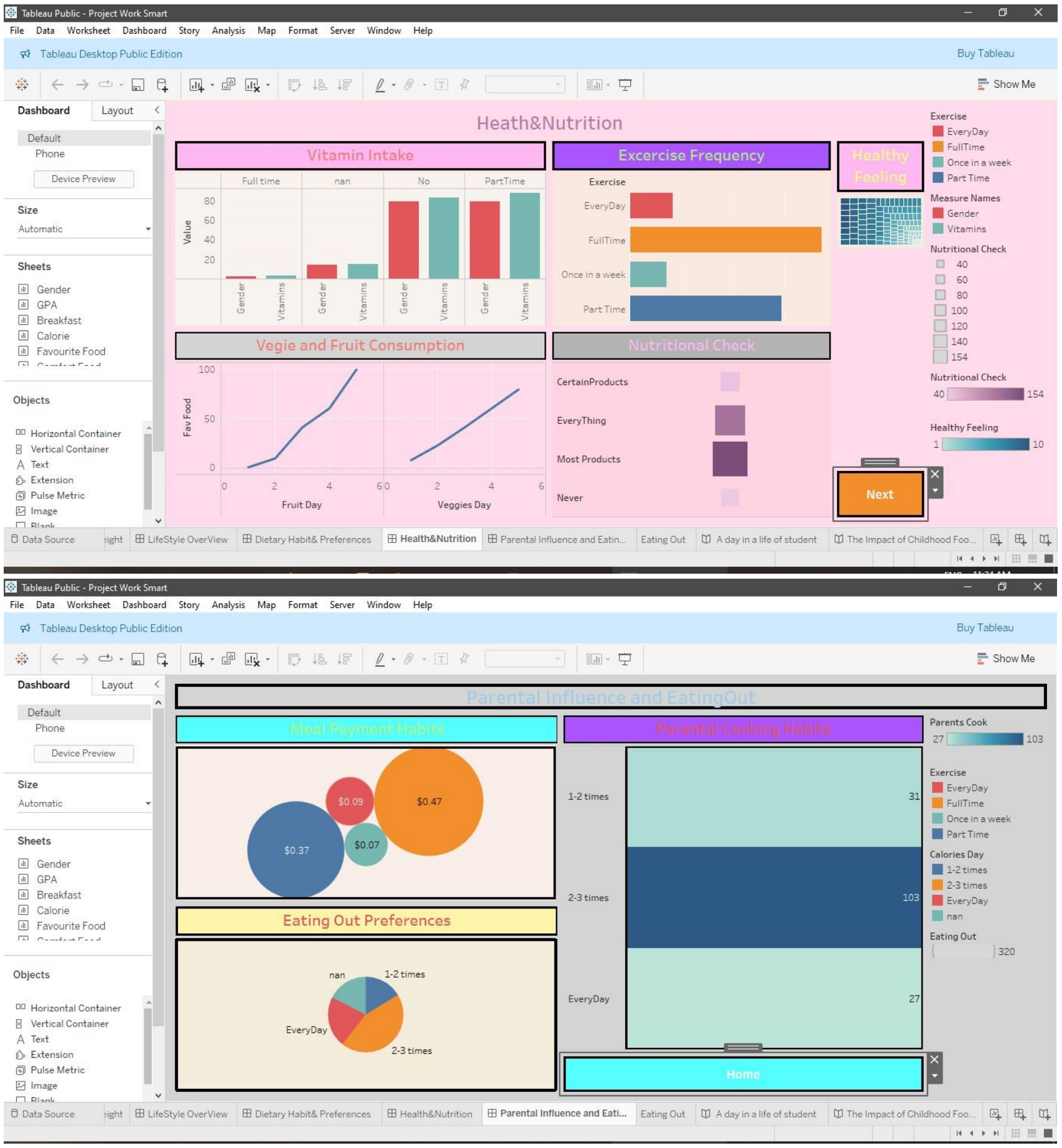
7. RESULTS

OutputScreenshots

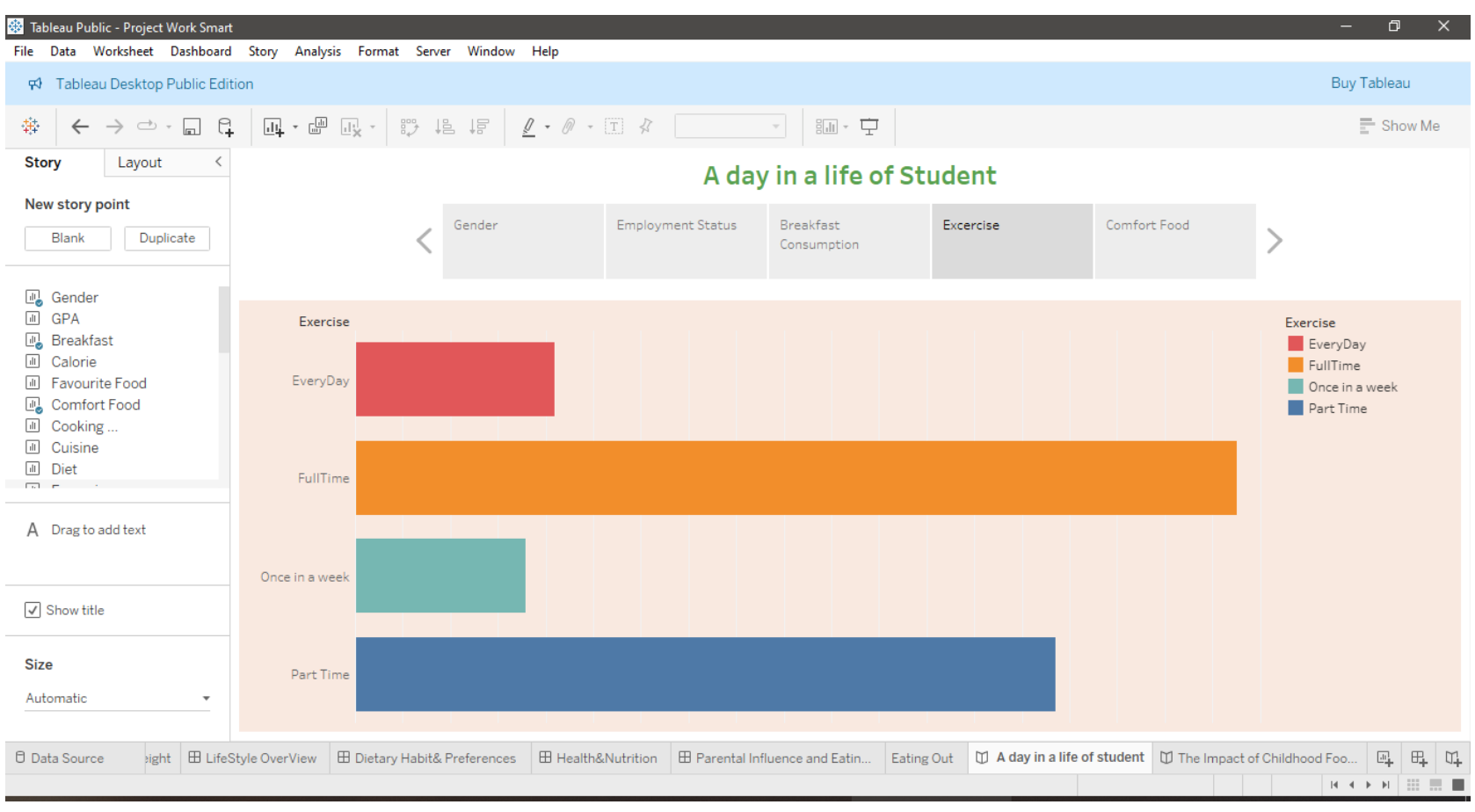
DASHBOARDSCREENSHOTS







No.OfStories



8. ADVANTAGES&DISADVANTAGES:

Advantages:

1. **Data-DrivenInsights**

- Enables in-depthanalysisofstudents' foodhabits, dietarypatterns, andnutritionalbehavior usingreal-timedata visualization.

2. **VisualClaritywith Tableau**

- Tableauprovidesinteractivedashboardsthatsimplifycomplexdata,makingpatternsandtrendseasierto understandforall stakeholders.

3,**Identification ofHealth Trends**

- Helpsinidentifying issueslikelowvitamin intake,highjunkfoodpreference,orirregularmealtimingamongstudents.

4. **CustomizableDietaryStrategies**

- Facilitatesthecreationofpersonalizeddiet plans basedonstudent groups(e.g.,bygender, exercise level, mealpreference)

Disadvantages:

1. **DataCollection Challenges**

- Gatheringaccurate, consistent,andhonestresponses fromcollegestudentscanbedifficultandtime-consuming.

2. **PrivacyConcerns**

- Handlingsensitive informationabouteating habitsandhealthwithoutproperanonymizationmayraiseethicalandprivacy issues.

3. **SkillRequirements**

- RequiresproficiencyinTableauanddataanalysis,whichmightbeabarrierfornon-technicalusers.

4. **DynamicBehaviorChanges**

- Studentfoodchoicescanchange frequentlyduetostress,budget,orschedule, making it hardto maintainconsistent analysis

9. CONCLUSION

1. Thecomprehensiveanalysisofcollegefoodchoices usingTableaurevealssignificantinsightsintothedietaryhabits, preferences, and nutritional awareness of students

2. Thevisualdashboardseffectivelycommunicatehowdemographic elementssuchasgender, academicstress,andexerciseroutines influence diet quality and nutritional choices.

3. This study emphasizes theimportanceofbalanced diets andtargetedinterventions topromotehealthier eatingbehaviors incollege environments.

4. TheTableauplatformenabledclear identificationof gaps—suchaslowvitaminintakeor irregular mealpatterns—andsuggested 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—suchas campus diningservices and healthcounselors—increatingimpactfuldietarystrategies tailoredtotheneeds of

thestudent population.

10. FUTURESCOPE

The integrationofdataanalyticsandvisualizationindietarystrategydevelopment holdsimmensepromise forshaping healthier college environments. Based on this study, several future directions can be explored:

1. •**PersonalizedNutrition Recommendations**
   Advancedanalyticscanbecombinedwithmachine learningalgorithmstoofferpersonalized mealsuggestionstailoredto an individual's health profile, dietary preferences, and academic schedule.
2. •**Integration withReal-TimeHealthMonitoring**
   Wearabledevicesand mobilehealthappscanbe integratedwithTableaudashboardstotrackcalorie intake, physical activity, sleep patterns, and stress levels for real-time feedback and intervention.
3. •**PredictiveModeling forHealth Outcomes**
   Using historicalanddemographicdata,predictivemodelscanbedevelopedto foreseepotentialhealthriskssuchas obesity, diabetes, or nutritional deficiencies among students.
4. •**BehavioralPattern Recognition**
   Incorporating behavioraldatacanhelp identifytriggersofunhealthyeatinghabits(e.g., examstress, late-night cravings), allowing for the design of targeted educational interventions.
5. •**Scalability toOtherInstitutions**
   Thestudyframeworkcanbeadaptedforothercollegesoruniversities,enabling benchmarkingandcomparativestudies across different demographics and geographies
6. **Policy-MakingandInstitutionalPlanning**
   Findingscaninformcampusfoodserviceplanning, menuredesign, andpolicychangestopromotesustainable, 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.

TeamLeaderGithubLink:https://github.com/harshidunthala/Comprehensive-analysis-and-dietary-strategies-with-Tableau-a-college-food-choices-case-study.

TeamMemberGithubLink:https://github.com/shaikabid123/comprehensive-analysis-and-dietary-strategies-with-tableau-a-college-food-choices-case-study

VideoDemoLink:https://drive.google.com/file/d/1ygbMMsi7B06RcC5Zk_4bW_MAfVgFd5Ph/view