

12. Performance Testing of Visualizations

12.1 Objective

The goal of performance testing is to evaluate the **efficiency, responsiveness, and scalability** of the Tableau dashboards created for analyzing college food choices. Performance tests ensure that the visualizations load quickly, render correctly across devices, and remain responsive during user interaction such as filtering or switching scenes.

12.2 Key Performance Metrics

Metric	Description
Dashboard Load Time	Time taken for the dashboard to load completely after initial access
Visualization Rendering Time	Time taken to load individual charts or visual components
Filter Response Time	Time taken to reflect results after applying a filter or parameter
Calculated Fields Evaluation	Time spent computing formulas, KPIs, or conditional visuals
Data Volume	Number of rows and columns processed within each worksheet

12.3 Testing Parameters

Test Parameter	Value
Dataset Size	~300 records × 35+ columns
Visualizations Used	12+ (bar, pie, scatter, heat map)
Story Scenes	3 Tableau story scenes
Filters Applied	GPA, Gender, Cuisine, Exercise
Calculated Fields	10+ metrics (e.g., Health Index, Meal Score)

12.4 Tools Used

- **Tableau Performance Recorder** – Built-in tool to log and analyze performance
 - **Browser DevTools** – Used to measure page load time when embedded via Flask
 - **Manual Testing** – Cross-device checks (Desktop, Tablet, Mobile)
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12.5 Test Results Summary

Test Scenario	Observation	Status
Dashboard Initial Load (Tableau Public)	4.2 seconds on average	✔ Pass
Filter Response (e.g., Gender = Female)	1.1 seconds	✔ Pass
Story Scene Switch Time	2.3 seconds between transitions	✔ Pass
Visual Rendering with All Filters Applied	Slight lag on mobile, smooth on desktop	⚠ Acceptable
Load on Flask Web Page	Fully rendered within 5–6 seconds (including embedded script)	✔ Pass

12.6 Recommendations for Optimization

Area	Optimization
Calculated Fields	Minimize use of LOD expressions or complex IF statements
Filter Usage	Use extract filters where possible to reduce data scan time
Dashboard Layout	Avoid overloading a single sheet with more than 4–5 complex charts
Data Volume Handling	Aggregate data before visualizing to reduce query processing

12.7 Conclusion

The dashboard performs **well under expected data volumes**, with acceptable response times for interactive features. With some light optimization, the system is highly usable and scalable for larger datasets in the future.