Mobile Usage Patterns: Exploring Screen Time & App Engagement Trends

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This project report outlines development and analytical insights derived from the Power BI dashboard project titled **"Mobile Usage Patterns: Exploring Screen Time & App Engagement Trends."** The dashboard was built to uncover meaningful behavioral patterns in mobile usage, screen time, and app engagement across demographics.

Dataset Overview

Primary Dataset

The dataset used for this project is named mobile_usage_behavioral_analysis and contains behavioral information of mobile users.

Key attributes in the dataset include:

Column	Description
User_ID	A unique identifier for each user
Age	User's age (ranging from 18 to 60)
Gender	User's gender (Male/Female)
Location	User’s city of residence (e.g., New York, Los Angeles, etc.)
Total_App_Usage_Hours	Total time spent on mobile apps in a day (in hours)
Daily_Screen_Time_Hours	Total screen time per day including all activity
Number_of_Apps_Used	Count of apps used by user in a day
Social_Media_Usage_Hours	Time spent on social media apps
Productivity_App_Usage_Hours	Time spent on productivity-related apps
Gaming_App_Usage_Hours	Time spent on gaming apps

Derived Tables (Power BI Engineered)

Table Name	Purpose
AgeAxis	To define numeric axis for continuous age trend visuals
AgeBinsTable	For custom binning of ages into 5-year ranges
GenderLookup	To maintain consistent gender sort order in visuals
App_Usage_By_Type	Extended with custom calculated columns and usage aggregations

Derived columns were added to enable better sorting (e.g., Age_Group_Sort, Age_Group_Label) and categorical breakdowns for clear grouping.

Tools Used: Power BI, DAX

Dashboard Layout & Visuals

The dashboard is composed of **five summary KPIs** and **five main visuals**, all interactive and responsive to filters with cross-filtering.

Top Row: Summary KPI Cards

These dynamic tiles display average values across all users, for example:

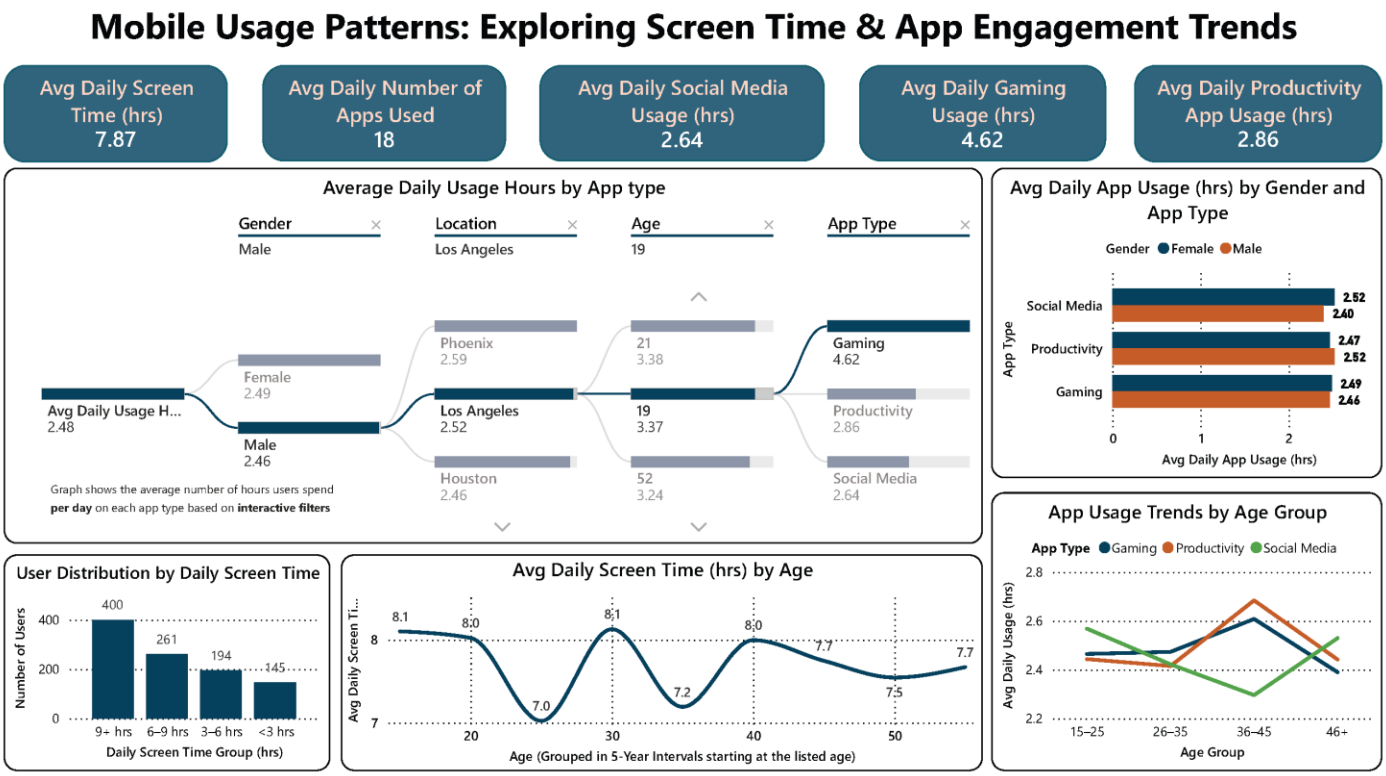
Metric	Value
Avg Daily Screen Time (hrs)	7.78
Avg Daily Number of Apps Used	16
Avg Daily Social Media Usage (hrs)	3.58
Avg Daily Gaming Usage (hrs)	1.51
Avg Daily Productivity App Usage (hrs)	2.11

These cards offer a quick-glance summary of overall usage behavior.

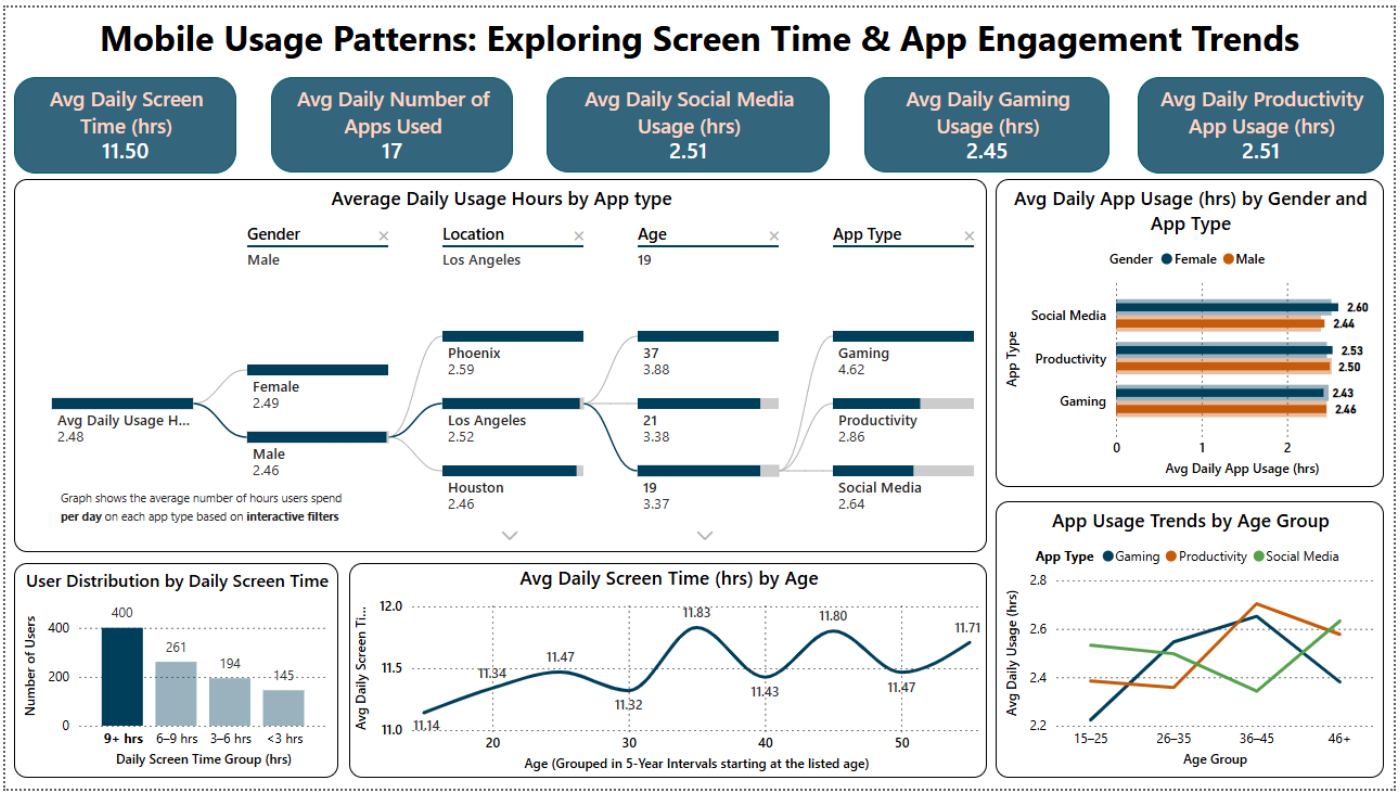
Dashboard Overview

Interactivity Notes

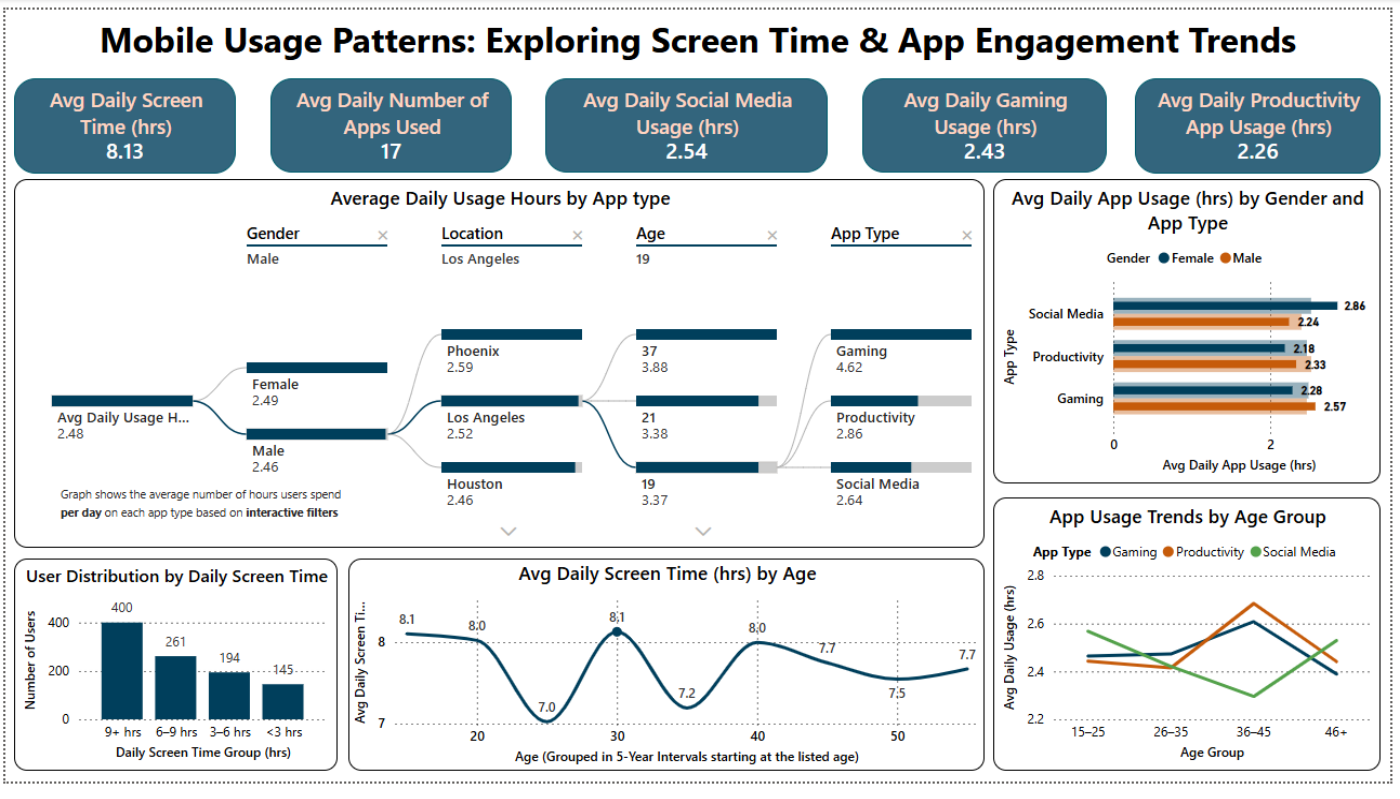
- **Synchronized visuals:** Filtering one chart affects others unless disabled (seen via the “no impact” icon).
- **Hover tooltips:** All visuals show precise metrics on hover.
- **Visual layering and text elements:** Organized using the Power BI Selection Pane for optimal readability.



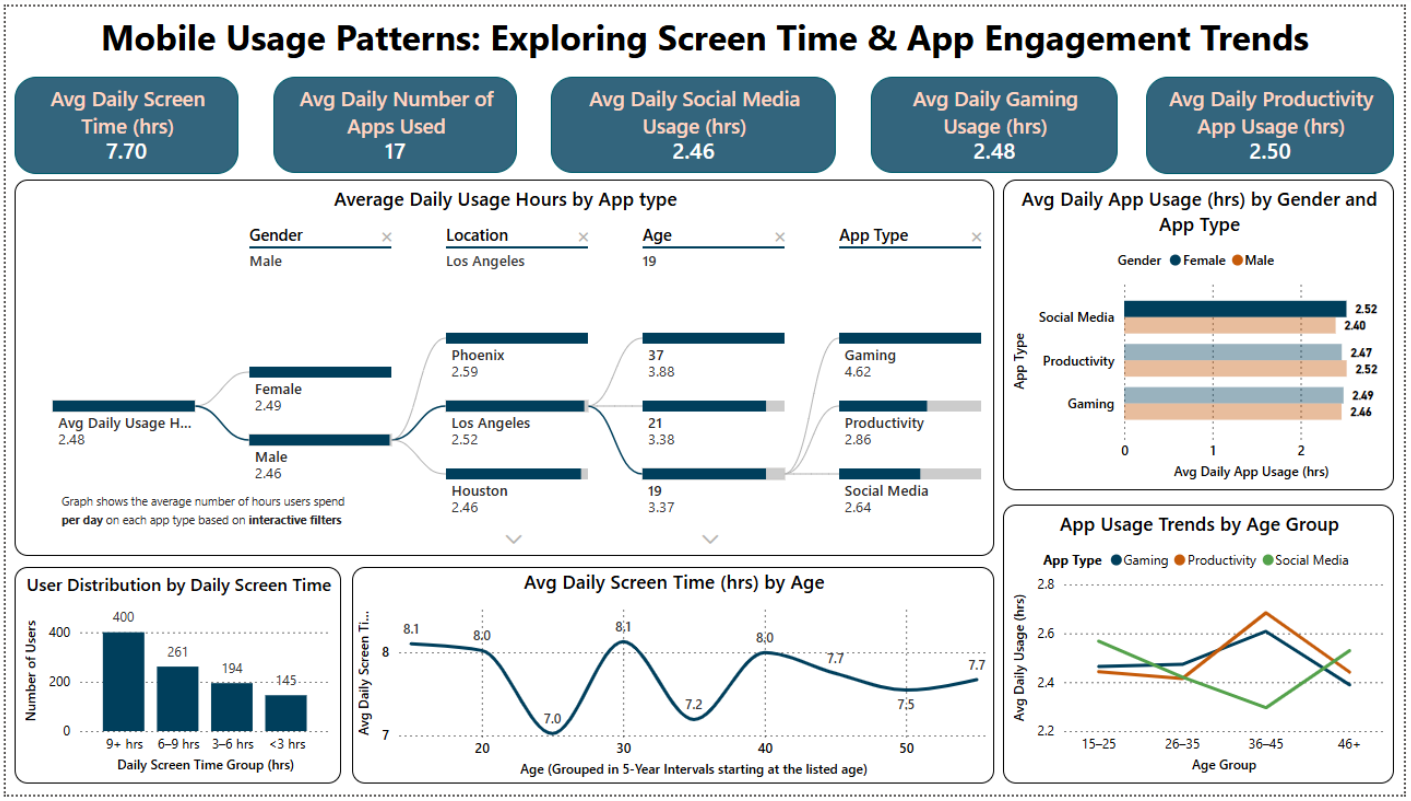
Average Daily Usage Hours by App Type



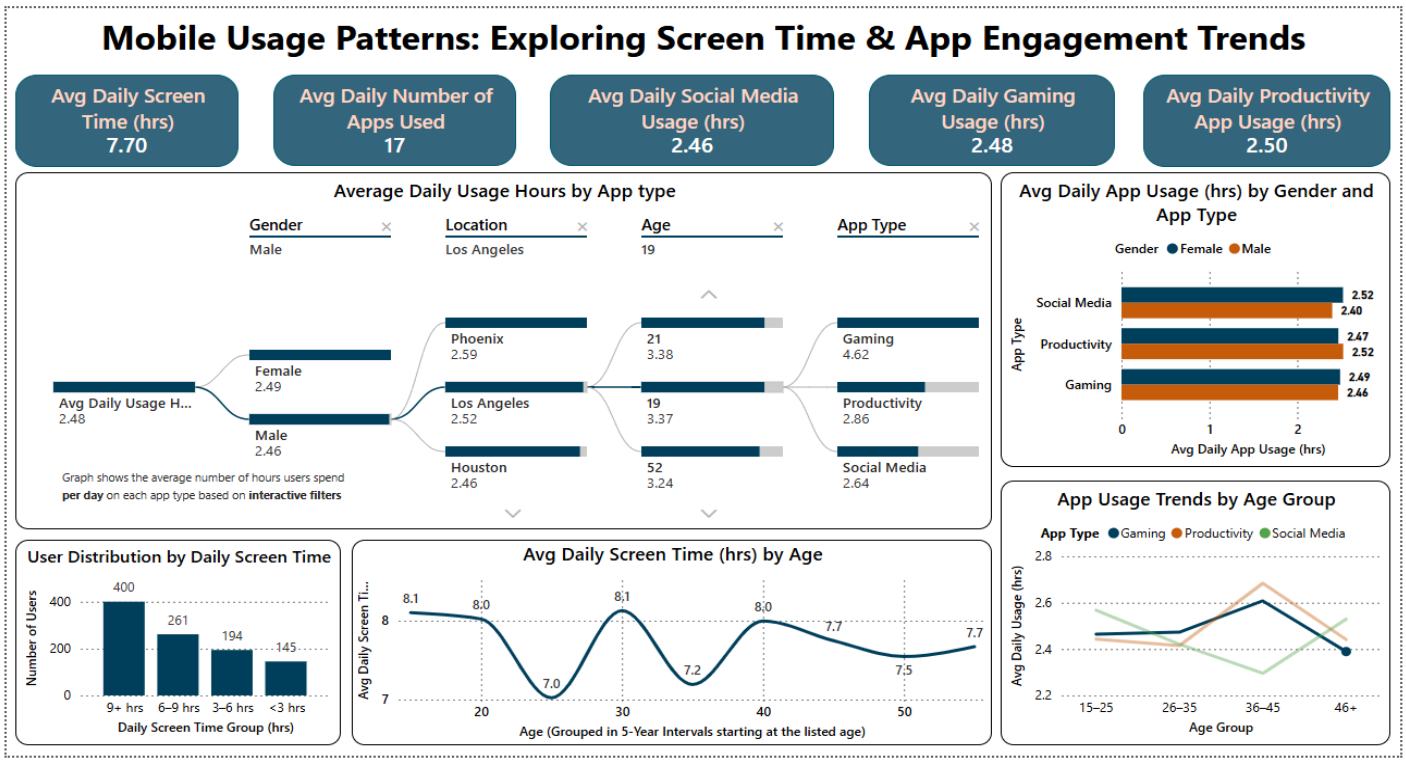
User Distribution by Daily Screen Time



Average Daily Screen Time (hrs) by Age

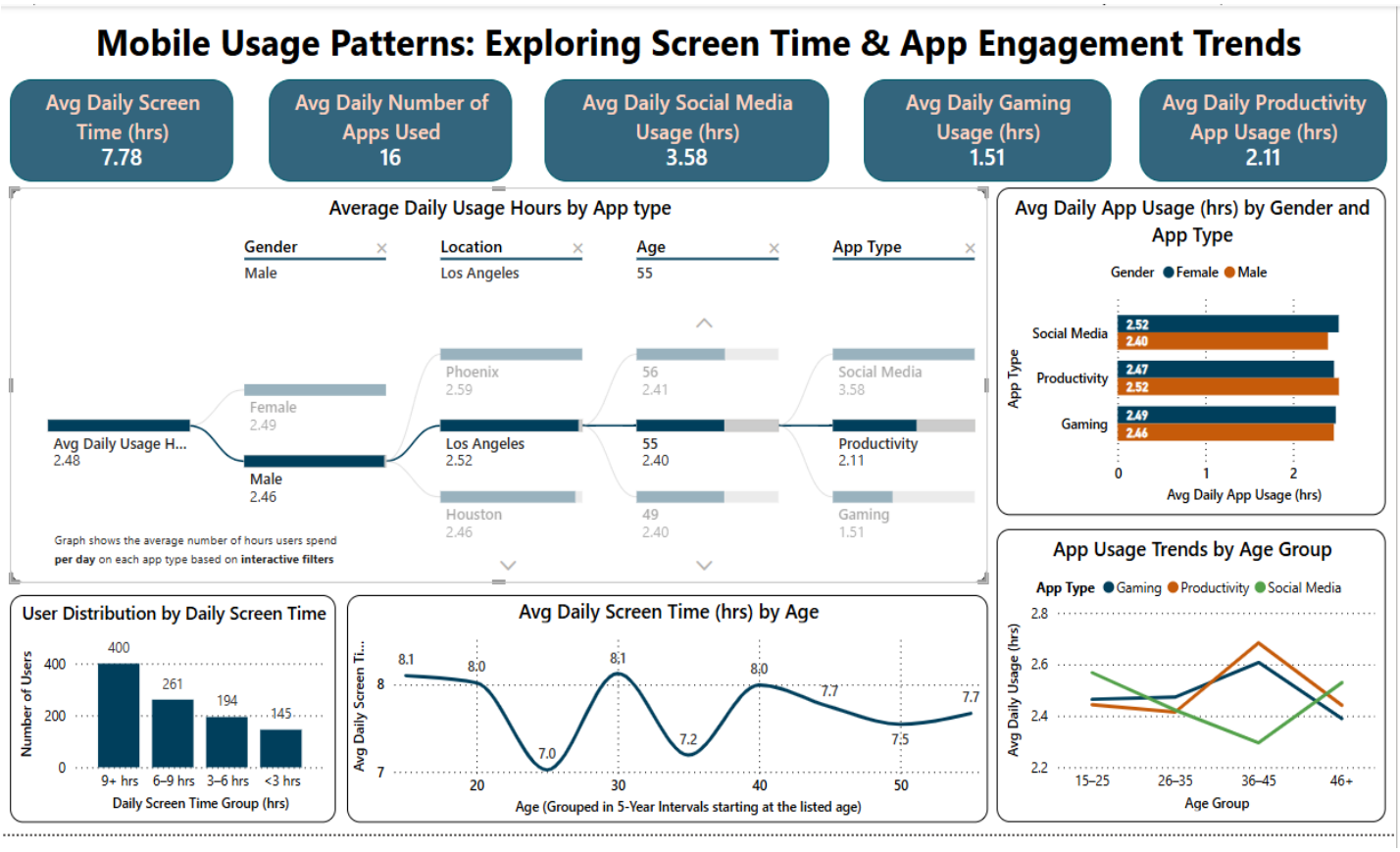


Average Daily App Usage (hrs) by Gender and App Type



App Usage Trends by Age Group

Visual Analysis & Detailed Insights



Interaction Example

1. Decomposition Tree: Avg Daily Usage Hours by App Type

- **Purpose:** Drill down into usage behavior from overall usage to demographics and app category.
- **Hierarchy Path:** Gender → Location → Age → App Type
- **Interaction Example:** Selecting Male users from Los Angeles aged 55:
  - **Social Media:** 3.58 hrs
  - **Productivity:** 2.11 hrs
  - **Gaming:** 1.51 hrs

This tool facilitates deep exploration of how combinations of demographic variables influence app usage behavior.

2. Bar Chart: Avg Daily App Usage (hrs) by Gender and App Type

- **Purpose:** Compare male vs. female usage by app category.
- **Insights:**
    - **Social Media:** Females use more (2.52 hrs) than males (2.40 hrs)
    - **Productivity:** Males slightly ahead (2.52 hrs vs. 2.47 hrs)
    - **Gaming:** Near identical (2.49 hrs vs. 2.46 hrs)

Subtle behavioral differences emerge between genders, particularly in social and productivity apps.

3. Column Chart: User Distribution by Daily Screen Time

- **Purpose:** Show how users are distributed across screen time brackets.
- **Insights:**
    - Majority of users (400) spend **9+ hours/day**
    - Gradual decline: 6–9 hrs (261), 3–6 hrs (194), <3 hrs (145)

This highlights heavy mobile dependency in a large portion of the user base.

4. Line Chart: Avg Daily Screen Time (hrs) by Age

- **Purpose:** Track screen time behavior by age (5-year intervals).
- **X-axis Note:** Each tick represents the start of a 5-year group (e.g., 20 → ages 20–24)
- **Insights:**
    - Peaks at **18 (8.1 hrs)**, **29 (8.1 hrs)**, and **39 (8.0 hrs)**
    - Dips at **24 (7.0 hrs)**, **34 (7.2 hrs)**, and **49 (7.5 hrs)**

Fluctuations reflect life-stage transitions like college, early career, and midlife.

5. Line Chart: App Usage Trends by Age Group

- **Purpose:** Visualize app type preferences across age groups.
- **Age Bins:** 15–25, 26–35, 36–45, 46+
- **Insights:**
    - **Social Media:** Most used in the **15-25 group** (~2.55 hrs)
    - **Gaming:** Peaks in the **36–45 group** (~2.6 hrs), not the youngest
    - **Productivity:** Highest in **36–45** (~2.75 hrs), aligning with working professionals

This reveals surprising patterns—younger users are more social-media active, and mid-aged users lead in productivity and gaming.

Summary

This Power BI dashboard provides a clear, engaging overview of how users interact with mobile devices based on age, gender, location, and app categories. All visuals are built with interactivity and clarity in mind.

The analysis can support:

- App development and personalization strategies
- Marketing segmentation by behavior
- UX research and product strategy targeting based on engagement levels