

## **Project Reflection: Mobile User Behavior Analysis (Excel)**

*Understanding engagement, usage intensity, and resource consumption using KPI helper columns, PivotTables, and PivotCharts.*

### **1) Business Context (What we wanted to find out)**

This project explores simulated mobile user behavior to answer a simple business question: what separates highly engaged users from low-engagement users, and what “cost” comes with that engagement (time spent, data usage, and battery drain)?

### **2) Key Questions**

- How many users are “active” (using the app  $\geq$  60 minutes/day)?
- How is engagement distributed (High / Medium / Low)?
- Do highly engaged users consume more time, data, and battery than others?
- Who are the heavy resource users (top 25% data and top 25% battery)?
- Does engagement differ by age group (<25, 25–40, 40+)?

### **3) Stakeholders (Who would use these insights)**

- Product Manager: improve features that drive engagement without harming user experience.
- Growth/Marketing: target segments likely to become high-engagement users.
- Engineering/Mobile team: reduce battery drain and data usage for heavy users.
- Customer Support: anticipate complaints (battery/data) from intensive users.

### **4) Data & Scope**

- Dataset size: 700 users
- Fields used heavily: Engagement\_Level, App Usage Time, Screen On Time, Data Usage, Battery Drain, Age
- Tool: Microsoft Excel (Tables, formulas, PivotTables, PivotCharts)

### **5) Data Preparation (What I cleaned and standardized)**

Before analysis, I ensured the data was consistent and PivotTable-ready.

- Verified columns had correct data types (numbers stored as numbers, text as text).
- Checked for blanks and handled them to reduce “[blank]” categories in pivots.

- Created a clean Excel Table so formulas auto-fill and pivots remain dynamic.

## 6) KPI Helper Columns (Formulas used)

To make analysis easier, I created helper columns that convert raw numbers into simple categories.

Active user ( $\geq 60$  minutes/day):

```
=IF([@App Usage Time (min/day)] >= 60, "Yes", "No")
```

High Data User (top 25% data usage):

Threshold (single cell): =PERCENTILE.INC(Table1[Data Usage (MB/day)], 0.75)

Flag (helper column): =IF([@Data Usage (MB/day)] >=\$P\$2, "Yes", "No")

High Battery Usage (top 25% battery drain):

Threshold (single cell): =PERCENTILE.INC(Table1[Battery Drain (mAh/day)], 0.75)

Flag (helper column): =IF([@Battery Drain (mAh/day)] >=\$P\$2, "Yes", "No")

Age Group bucketing:

```
=IF([@Age] < 25, "<25", IF([@Age] <= 40, "25-40", "40+"))
```

## 7) Primary Analysis (PivotTables & Charts)

I built PivotTables to summarize user counts and averages, and PivotCharts to make patterns easy to see. Key pivots included:

- Active User Rate (Yes/No)
- Engagement Distribution (High/Medium/Low)
- Engagement vs Average App Usage Time
- Engagement vs Average Screen Time
- Engagement vs Average Data Usage
- Engagement vs Average Battery Drain
- High Data Users (Top 25%)
- High Battery Users (Top 25%)
- Engagement Level by Age Group

## 8) Results (What the data showed)

Below are the final KPI outcomes from the PivotTables:

- Total users: 700
- Active users ( $\geq 60$  min/day): 91.29% (639 users) | Low activity: 8.71% (61 users)
- Engagement distribution: High 418 | Medium 221 | Low 61
- Avg App Usage Time (min/day): High 388 | Medium 112 | Low 44 | Overall 271
- Avg Screen On Time (hours/day): High 7 | Medium 3 | Low 2 | Overall 5
- Avg Data Usage (MB/day): High 1333 | Medium 369 | Low 196 | Overall 930
- Avg Battery Drain (mAh/day): High 2097 | Medium 741 | Low 444 | Overall 1525
- High Data Users (Top 25%): Yes 25% | No 75%
- High Battery Users (Top 25%): Yes 25% | No 75%

## 9) What it means

- Engagement is strongly linked to intensity: High-engagement users spend much more time and also consume far more data and battery.
- The “cost of engagement” is real: compared to Low users, High users use  $\sim 6\text{--}9$ x more data and  $\sim 4\text{--}5$ x more battery on average.
- Most users are active (91.29%), meaning the product has strong daily usage — but efficiency becomes a key risk (battery/data).
- The top 25% heavy users are a clear segment: they are most likely to notice performance, battery drain, and data issues first.

## 10) Age Group Pivot

Engagement by Age Group (counts):

- <25: High 79 | Medium 19 | Low 12 (Total 110)
- 25–40: High 150 | Medium 101 | Low 25 (Total 276)
- 40+: High 189 | Medium 101 | Low 24 (Total 314)

Interpretation:

- The 40+ group is the largest segment and contributes the most High-engagement users by volume.
- The 25–40 group has a large Medium segment — ideal for conversion strategies (Medium  $\rightarrow$  High).
- Low engagement stays small across all ages, so disengagement is not concentrated in one age group.

## **11) Recommendations (What I would suggest to the business)**

- Optimize efficiency for heavy users: improve battery/data performance for the High and Top-25% segments (compression, caching, background activity controls).
- Create a “Medium → High” plan for 25–40 users: targeted features, onboarding nudges, and value reminders to lift engagement.
- Add “usage health” monitoring: track battery and data KPIs alongside engagement so growth doesn’t create a worse user experience.
- Segment support messaging: proactively educate heavy users on data/battery settings to reduce complaints and churn.

## **12) Reflection (What I learned / what I would do next)**

- PivotTables are powerful for fast KPI discovery — but helper columns are what make insights clean and repeatable.
- Percentages (e.g., % of Row Total) can tell a clearer story than counts when groups have different sizes.
- Next step: build a simple predictive model (or scoring) to estimate engagement from time/data/battery and identify early “upgrade” users.