Mobile User Behavior Dashboard

Detailed Pivot Table Explanations + Formulas Used (Excel)

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Dataset: Simulated mobile user behavior (700 users)

1. Executive Summary

I built a KPI dashboard in Excel to explain mobile user engagement. Using helper columns and pivot tables, I segmented users into Active vs Not Active (based on a 60+ min/day threshold), and compared Low/Medium/High engagement users across app time, screen time, data usage, and battery drain. The pivots show that higher engagement is strongly linked to higher app usage time and higher resource consumption (data + battery).

2. KPI Helper Columns (Formulas Used)

These helper columns make the pivots meaningful, because they turn raw numbers into clear groups (Yes/No flags).

2.1 Active_User_60min (Meaningful Active User Definition)

Goal: Split users into Active vs Not Active based on app usage time.

```
=IF([@[App Usage Time (min/day)]]>=60,"Yes","No")
German separator variant: =IF([@[App Usage Time (min/day)]]>=60;"Yes";"No")
German function-name variant: =WENN([@[App Usage Time
(min/day)]]>=60;"Yes";"No")
```

- If App Usage Time is 60 minutes or more → Yes.
- If App Usage Time is less than 60 minutes → No.
- Why 60 minutes? It creates a practical definition of 'active' instead of counting everyone as active.

2.2 High_Data_User (Top 25% Data Users)

Goal: Flag the top 25% of users by daily data consumption.

Step A: Calculate the 75th percentile threshold (one cell, e.g., O2).

```
=PERCENTILE.INC(Table1[Data Usage (MB/day)],0.75)
This returns the value where 75% of users are below it and 25% are above it.
```

Step B: Compare each user's data usage to the threshold and label Yes/No.

```
=IF([@[Data Usage (MB/day)]]>=$O$2,"Yes","No")
```

2.3 High_Battery_Usage (Top 25% Battery Drain Users)

Goal: Flag the top 25% of users by daily battery drain.

Step A: Calculate the 75th percentile threshold (one cell, e.g., P2).

```
=PERCENTILE.INC(Table1[Battery Drain (mAh/day)],0.75)
```

Step B: Compare each user's battery drain to the threshold and label Yes/No.

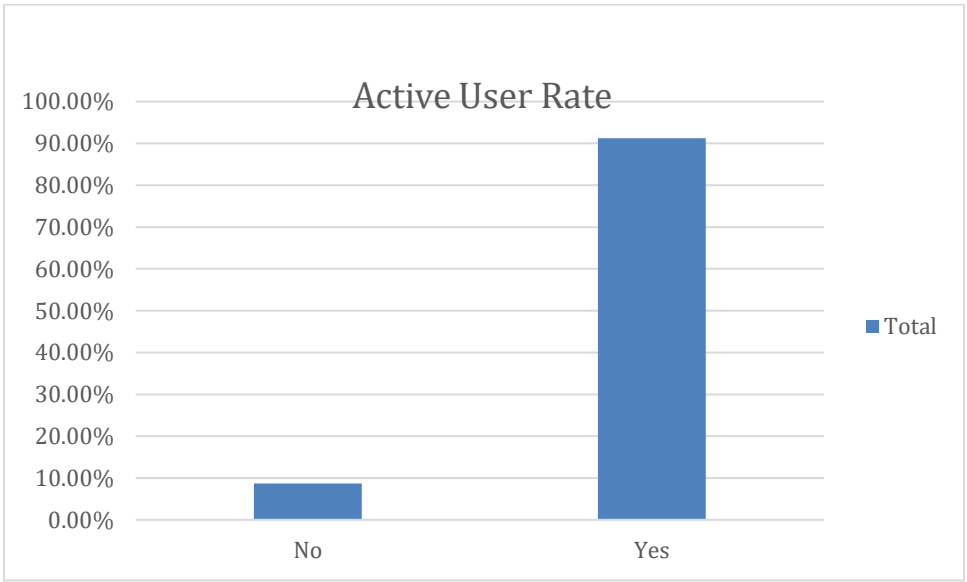
```
=IF([@[Battery Drain (mAh/day)]]>=$P$2,"Yes","No")
```

3. Pivot Tables & Charts (Explained)

Pivot 1: Active User Rate (Active_User_60min)

Question answered: Which users are highly active versus low activity users?

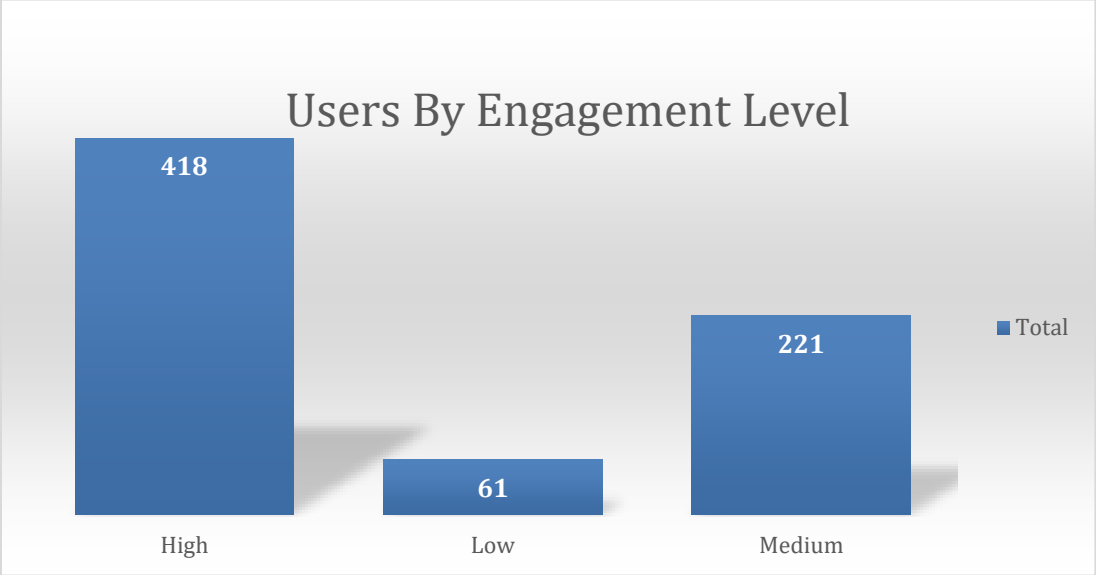
- Rows: Active_User_60min (Yes/No)
- Values: Count of User ID
- Show Values As: % of Column Total (to show a rate)
- Result: Yes = 91.29% (≈639 users), No = 8.71% (≈61 users).
- Meaning: Almost all users are active by the 60+ min/day rule; ~9% are light users.



Pivot 2: Users by Engagement Level

Question answered: How many users fall into High, Medium, and Low engagement?

- Rows: Engagement_Level (High/Medium/Low)
- Values: Count of User ID
- Result: High 418 | Medium 221 | Low 61 (Total 700).
- Meaning: High engagement is the largest group; Low is smallest but a growth opportunity.

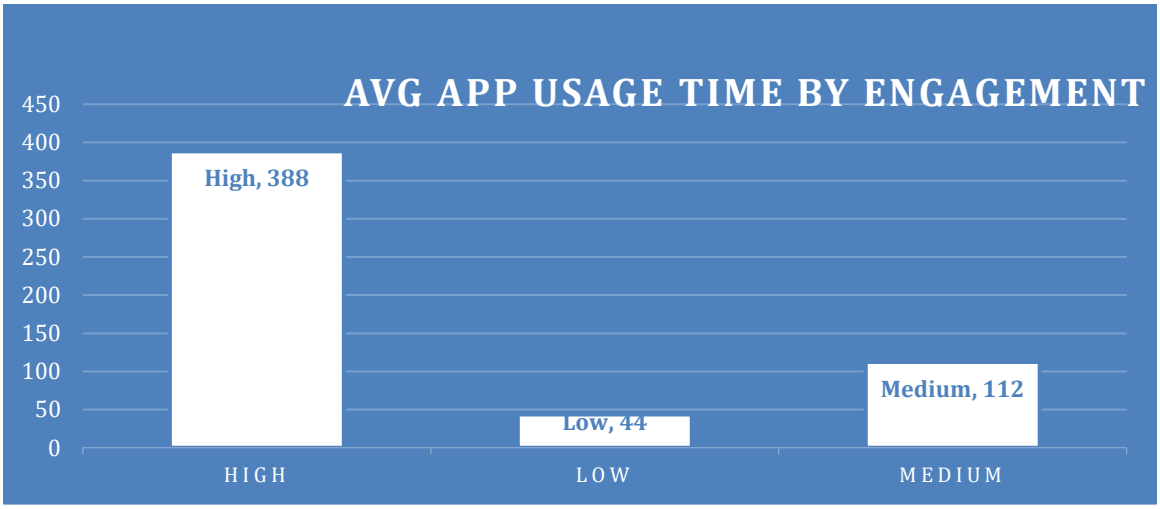


Pivot 3: Avg App Usage Time by Engagement

Question answered: How does app usage time change across engagement levels?

- Rows: Engagement_Level
- Values: App Usage Time (min/day) → Average
- Result: High 388 | Medium 112 | Low 44 (Overall 271).
- Meaning: Engagement increases sharply with app time.

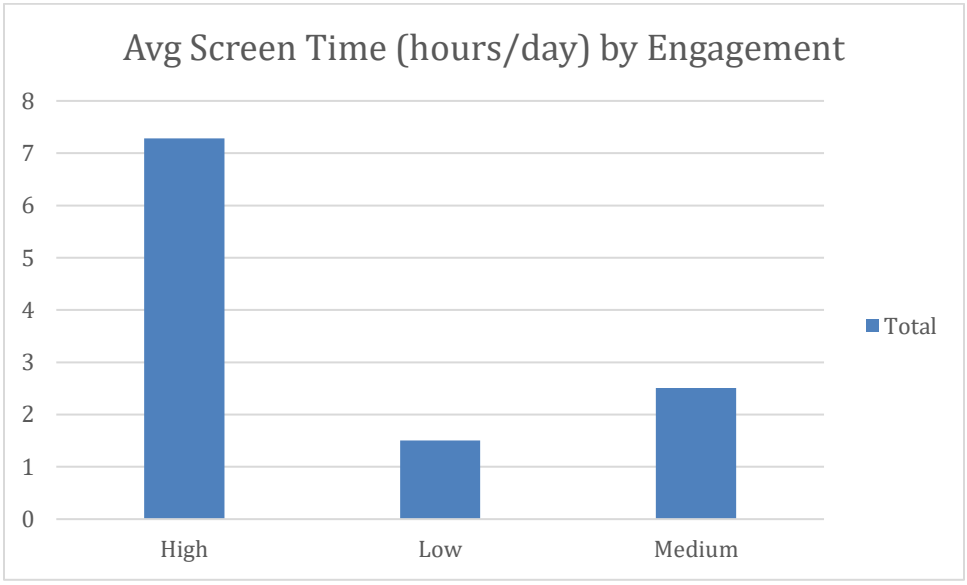
Chart note: Used a column chart. We Avoid pie charts for averages because pie implies 'share of a whole'.



Pivot 4: Avg Screen On Time by Engagement

Question answered: Do highly engaged users spend more time on their screen overall?

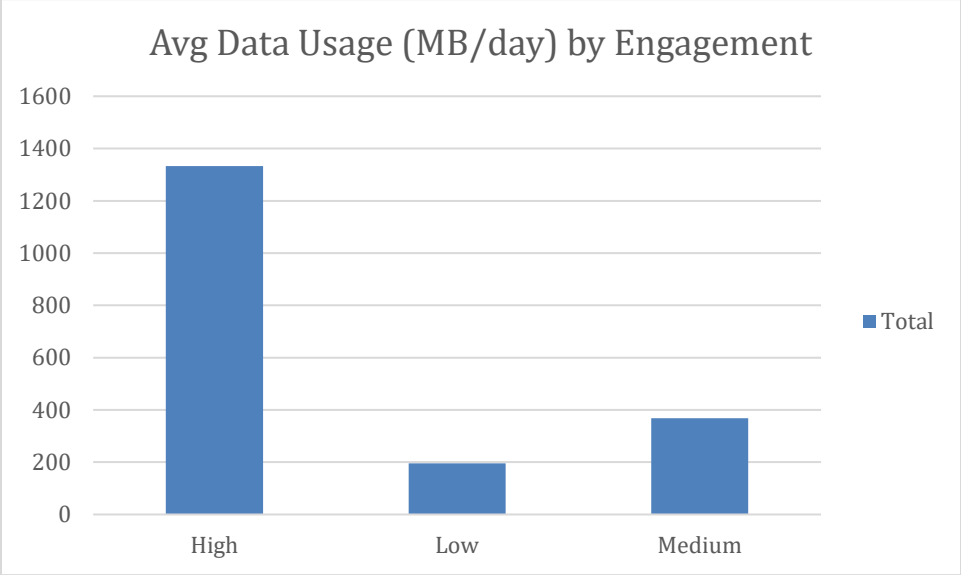
- Rows: Engagement_Level
- Values: Screen On Time (hours/day) → Average
- Result: High 7 | Medium 3 | Low 2 (Overall 5).
- Meaning: High engagement users are heavier phone users overall.



Pivot 5: Avg Data Usage by Engagement

Question answered: Do highly engaged users consume more data?

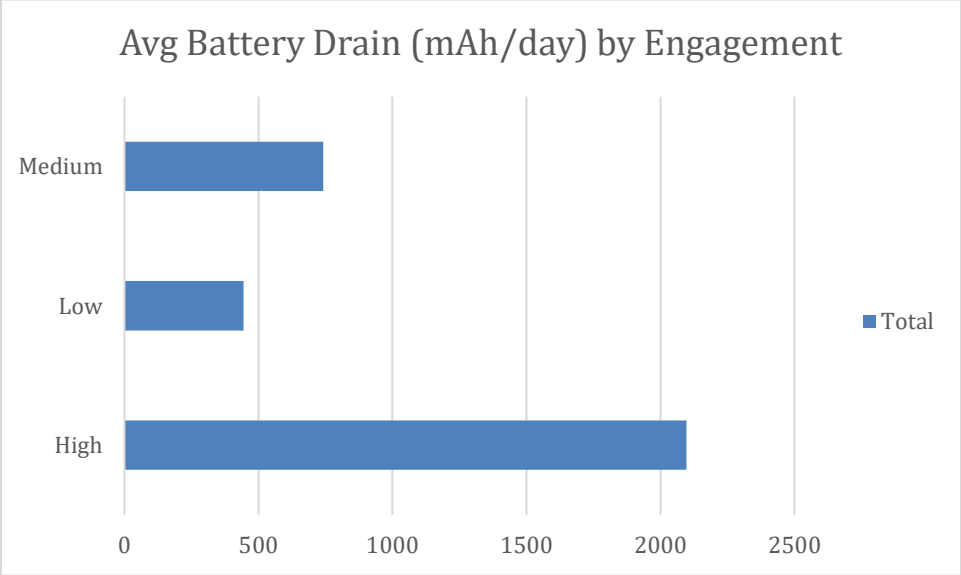
- Rows: Engagement_Level
- Values: Data Usage (MB/day) → Average
- Result: High 1333 | Medium 369 | Low 196 (Overall 930).
- Meaning: High engagement is linked to much higher data usage.



Pivot 6: Avg Battery Drain by Engagement

Question answered: Do highly engaged users drain more battery?

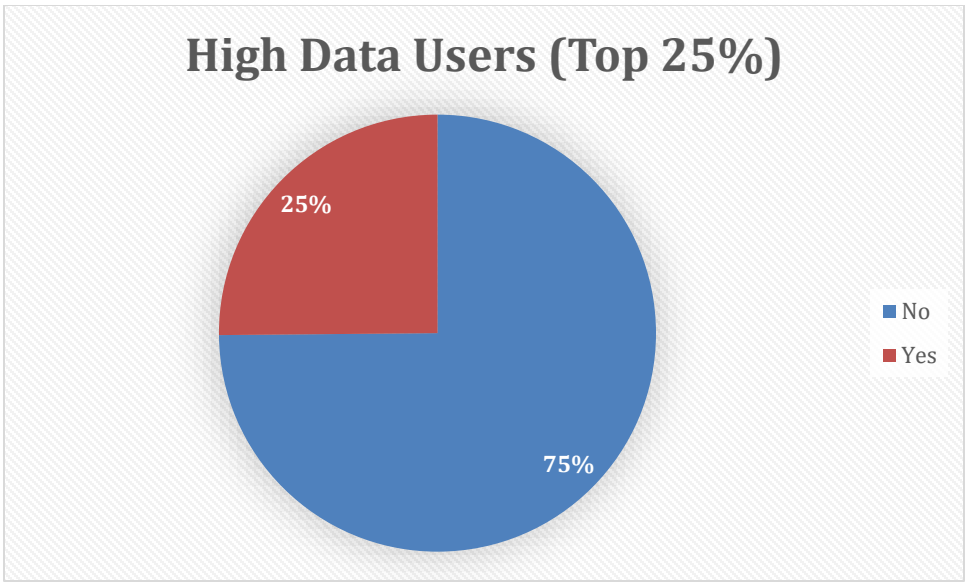
- Rows: Engagement_Level
- Values: Battery Drain (mAh/day) → Average
- Result: High 2097 | Medium 741 | Low 444 (Overall 1525).
- Meaning: High engagement users drain significantly more battery.



Pivot 7: High Data Users (Top 25%)

Question answered: Which users are heavy data users?

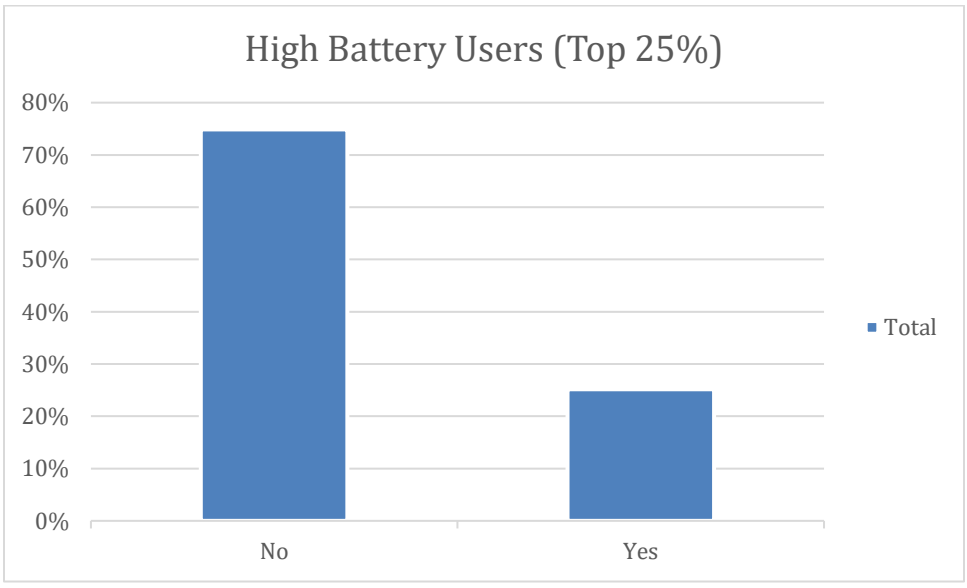
- Rows: High_Data_User (Yes/No)
- Values: Count of User ID
- Show Values As: % of Column Total
- Result: Yes 25%, No 75%.
- Meaning: Your percentile-based flag is working as designed.



Pivot 8: High Battery Users (Top 25%)

Question answered: Which users are heavy battery users?

- Rows: High_Battery_Usage (Yes/No)
- Values: Count of User ID
- Show Values As: % of Column Total
- Result: Yes 25%, No 75%.
- Meaning: Identifies the battery-heavy segment for optimization.

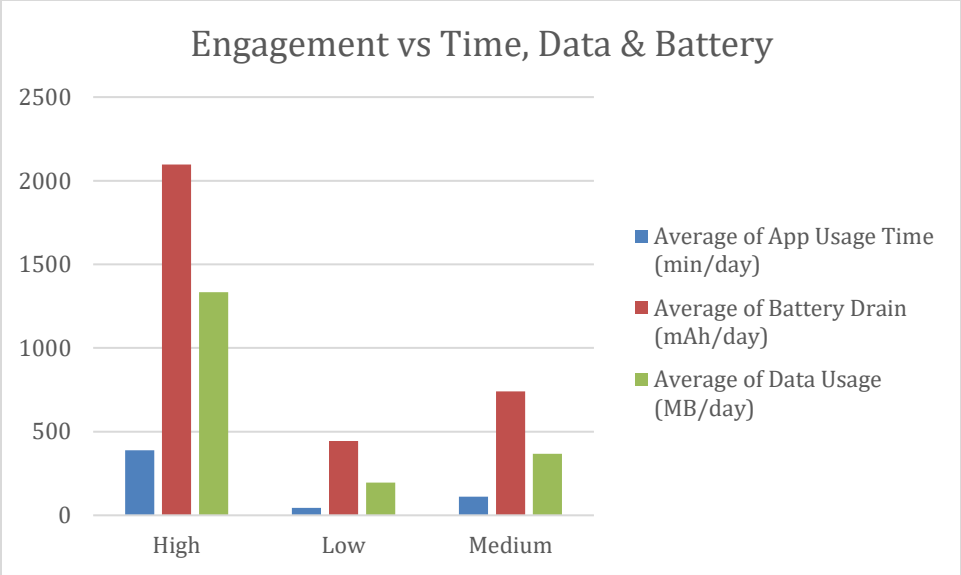


Pivot 9: Combined KPI Summary by Engagement

Question answered: How do key KPIs move together as engagement changes?

- Rows: Engagement_Level
- Values: Average App Usage Time, Average Battery Drain, Average Data Usage
- High: 388 min/day | 2097 mAh/day | 1333 MB/day
- Medium: 112 min/day | 741 mAh/day | 369 MB/day
- Low: 44 min/day | 444 mAh/day | 196 MB/day
- Meaning: Higher engagement consistently means higher usage time and higher data + battery consumption.

Important cleanup: Filtered out '(blank)' in Engagement_Level.



Pivot 9: Engagement Level by Age Group

Which age group has more High / Medium / Low engagement users?

A) Helper Column Used (Age Group) — Formula

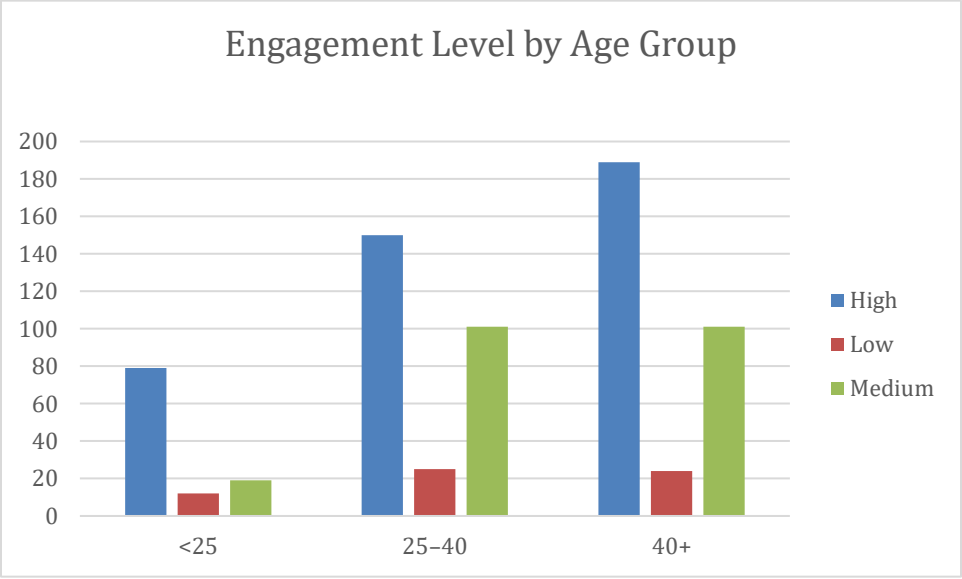
=IF(I2="","Unknown",IF(I2<25,"<25",IF(I2<=40,"25–40","40+")))

- If Age is below 25 → <25
- If Age is between 25 and 40 (inclusive) → 25–40
- If Age is above 40 → 40+

- Rows: Age Group
- Columns: Engagement_Level (High / Medium / Low)
- Values: Count of User ID

Counts of users in each age group by engagement level:

- <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
- Overall totals: High 418 | Medium 221 | Low 61 | Total 700
- Meaning: High engagement is the biggest category in every age group. The 40+ group is the largest segment (314 users) and has the most High-engagement users (189).



4. Final Insights

- Engagement is strongly linked to usage intensity: High users spend far more time in apps.
- High engagement users consume far more data and battery—performance and efficiency should focus here.
- Medium users are the best group to convert to High with targeted improvements.
- Low users are a small segment but represent onboarding and retention opportunity.

5. Recommendations

- Retention: Protect High engagement users (largest drivers of usage).
- Optimization: Reduce battery and data drain for High users (caching, lightweight screens, background limits).
- Growth: Target Medium users with nudges and features to increase engagement.
- Onboarding: Reduce friction for Low users; guide them toward 60+ min/day behavior.
- Monitoring: Track Active_User_60min rate, Avg Data Usage, Avg Battery Drain, and the % of High Data/Battery users.

6. Limitations

- Drop-off/retention timing requires date/time history per user (not present here).
- Forecasting future usage requires time-series data (past days/weeks per user).

7. Appendix: How I displayed percentages in the pivots

- Right-click a value in the pivot → Show Values As → % of Column Total.