SCREEN SENSE – KIDS' SCREENTIME VISUALIZATION

WEEK 5 REPORT – COHORT AND SEGMENT ANALYSIS

1. OBJECTIVE

The objective of Week 5 was to perform Cohort and Segment-based Visual Analysis on the cleaned Screen Sense dataset. This phase focused on comparing screen-time behaviour across age groups, gender, regions, and device categories to understand deeper behavioural patterns among children.
The goal was to identify how different demographic segments vary in their screen use and health impact levels.

2. IMPLEMENTATION

Week 5 involved generating several advanced visualizations using Python (Pandas, Seaborn, Matplotlib).
Each chart helped highlight relationships between age, gender, device type, region, and digital health indicators.

Figure 1: Average Screen Time by Age Band × Device Type (Heatmap)

This cohort heatmap compares the mean daily screen time across every age band and device type.
It shows that older children tend to spend more time on smartphones and laptops, while younger kids use devices for comparatively fewer hours.

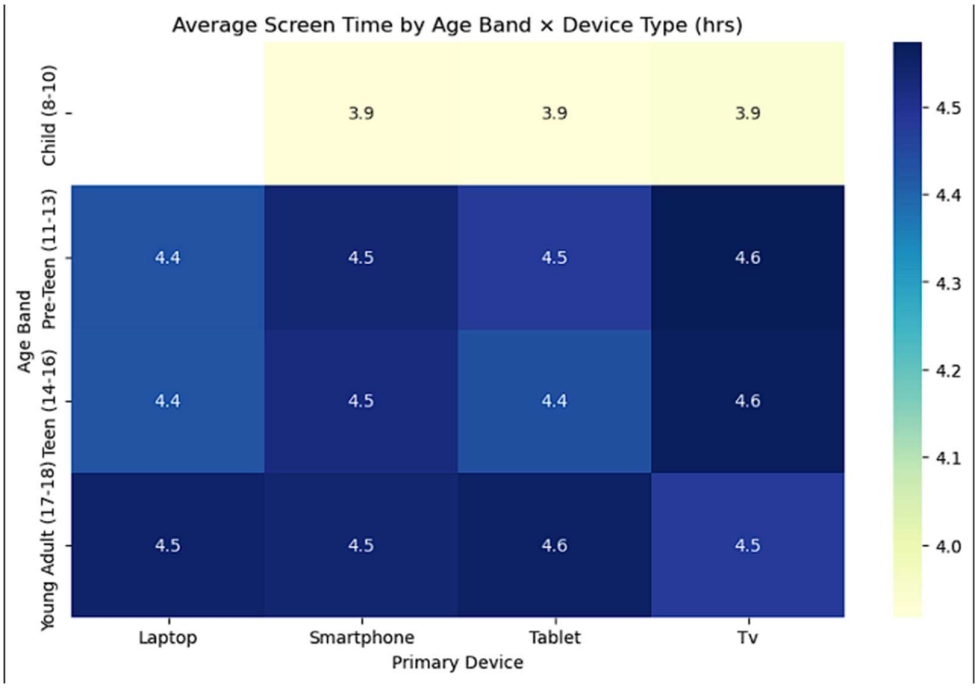

Figure 2: Screen Time Level Distribution by Gender (Stacked Bar Chart)

This stacked bar chart displays the distribution of low, moderate, and high screen-time levels among boys and girls.The results show that both genders mostly fall in the moderate range, while boys have a slightly higher proportion in the high screen-time category.

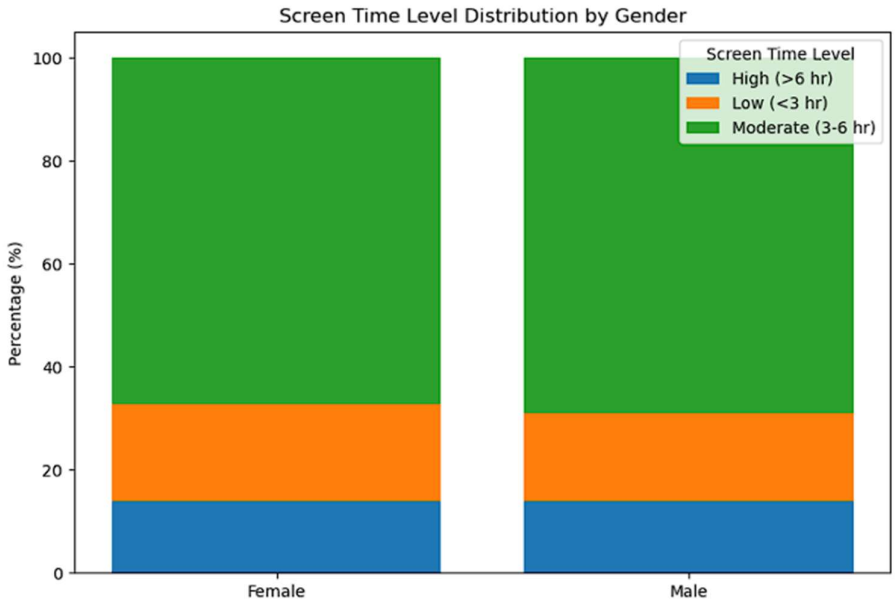

Figure 3: Screen Time by Device Type and Gender (Strip Plot)

The strip plot compares screen-time values across different devices while separating the points by gender.
It highlights that smartphones are widely used among both genders, with boys showing a few more extreme high-usage cases.

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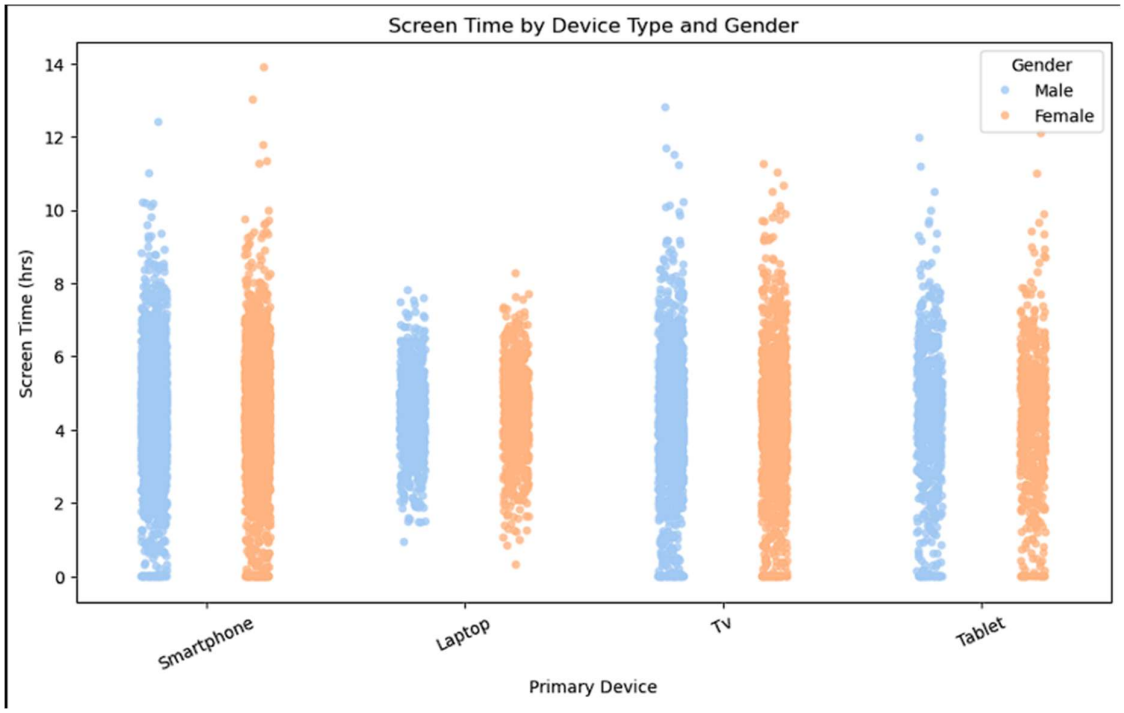


Figure 4: Screen Time Distribution Across Age Bands (Ridgeline Plot)

This ridgeline density plot shows how screen-time hours are distributed within each age band.
Older kids exhibit wider and more right-shifted curves, indicating longer daily usage compared to younger children.

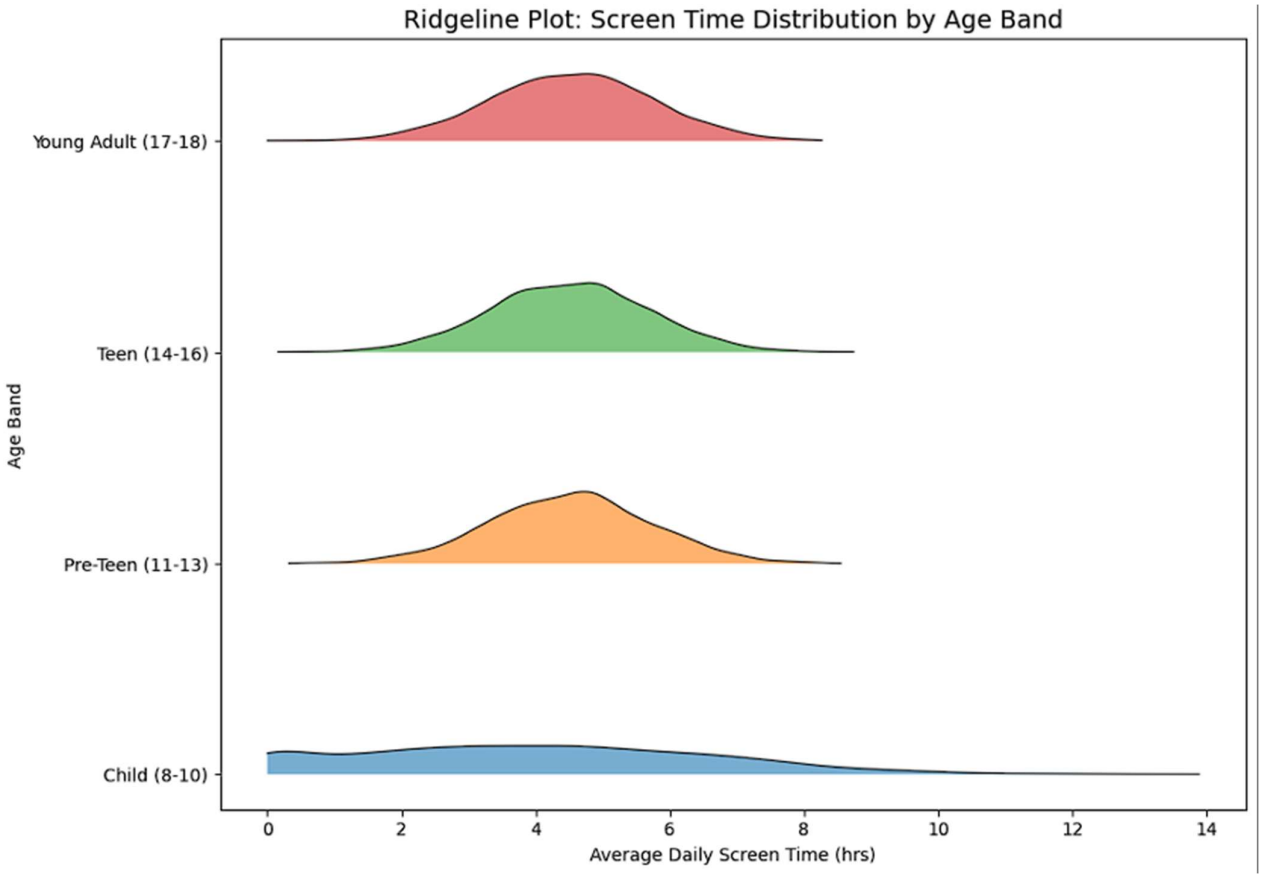


Figure 5: Screen Time vs Health & Learning Patterns (Dual-Axis Chart)

This visualization compares three metrics across age bands:

- Average daily screen time
- Average health impact count
- Educational-to-recreational usage ratio

It reveals that screen time and health impacts gradually increase with age, while the learning ratio decreases for older children.

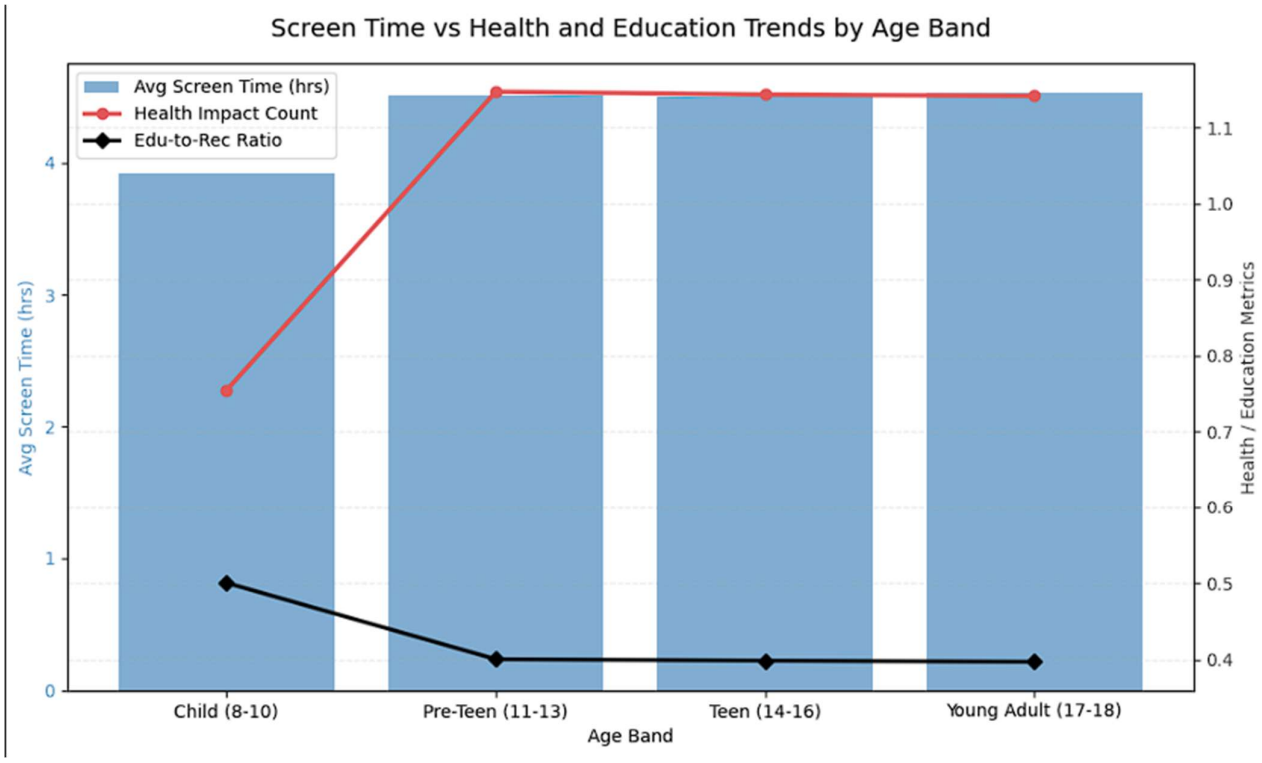


Figure 6: Average Screen Time by Device Type (Donut Chart)

This donut chart displays adjusted average screen time for each device.
Smartphones show the highest usage, even after applying adjustment factors, while devices like laptops and TVs have slightly lower usage.

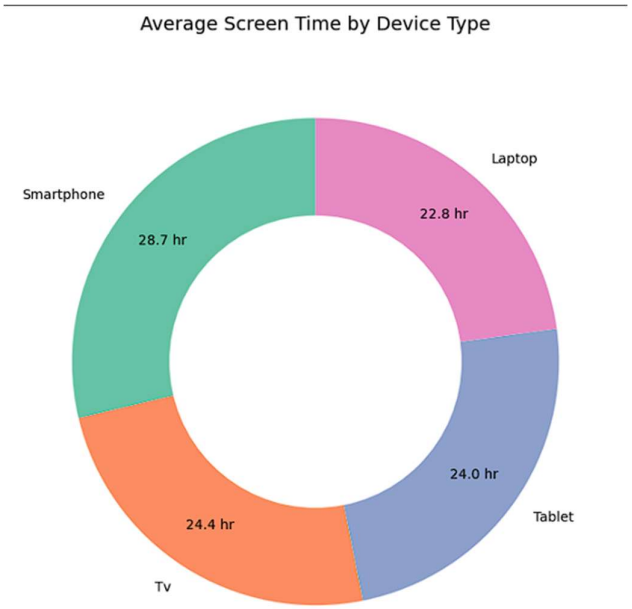
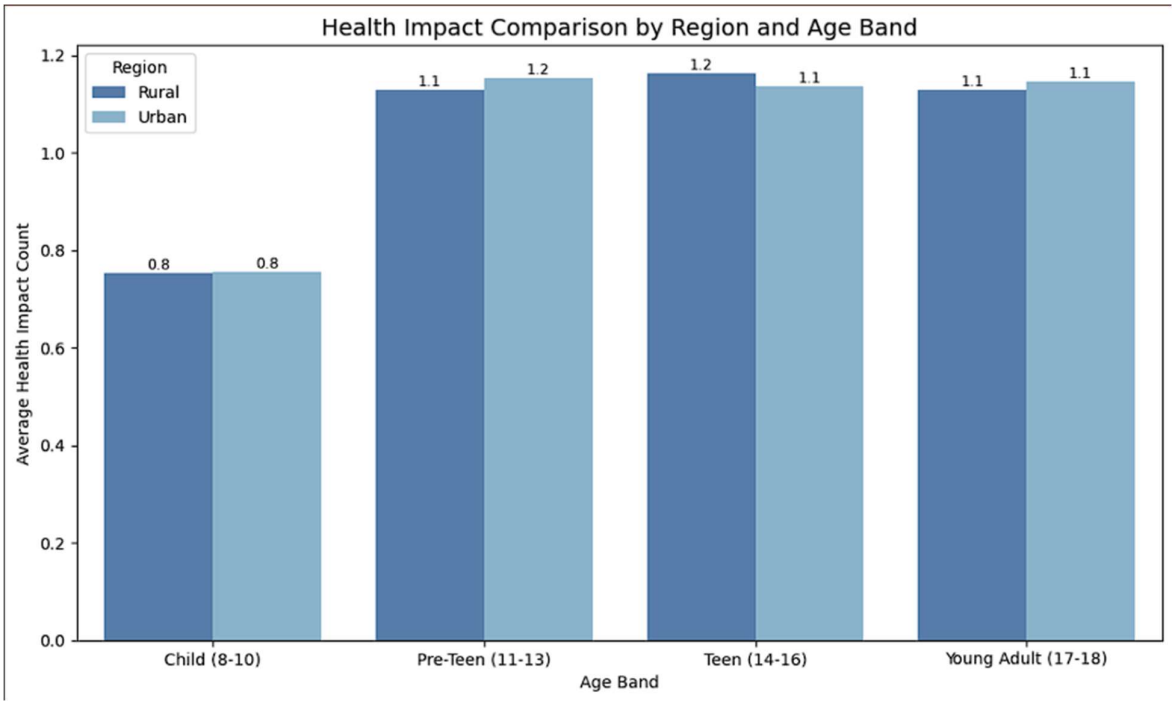


Figure 7: Health Impacts by Region & Age Band (Clustered Bar Chart)

This chart compares average health impact counts between urban and rural children across all age bands.
Urban kids generally report slightly higher digital-health concerns, especially among older age groups.



WEEK 6 REPORT – HABIT & DEPENDENCY PATTERN

1. OBJECTIVE

The objective of Week 6 was to identify habit patterns, specifically focusing on digital dependency levels among children.
Since the dataset does not contain date or seasonal information, Seasonal/Calendar Analysis could not be performed, and only Habit/Dependency segmentation was implemented.

2. IMPLEMENTATION

A Dependency Score was created using a combination of screen time and health-impact metrics.
Based on this score, children were grouped into:

- Low Dependency
- Medium Dependency
- High Dependency

Several visualizations were produced to examine how dependency levels vary across devices, regions, and age bands.

```
Dependency Levels Added:
   Avg_Daily_Screen_Time_hr  Health_Impact_Count  Dependency_Score  \
0                      3.99                    2              3.19
1                      4.61                    1              3.17
2                      3.73                    1              2.64
3                      1.21                    0              0.73
4                      5.89                    2              4.33

    Dependency_Level
0  Medium Dependency
1  Medium Dependency
2     Low Dependency
3     Low Dependency
4    High Dependency
```

Figure 8: Device Preference Across Dependency Levels (Count Plot)

This chart shows which devices are most frequently used at each dependency level.
High-dependency children tend to rely more on smartphones, while low-dependency users show more balanced usage.

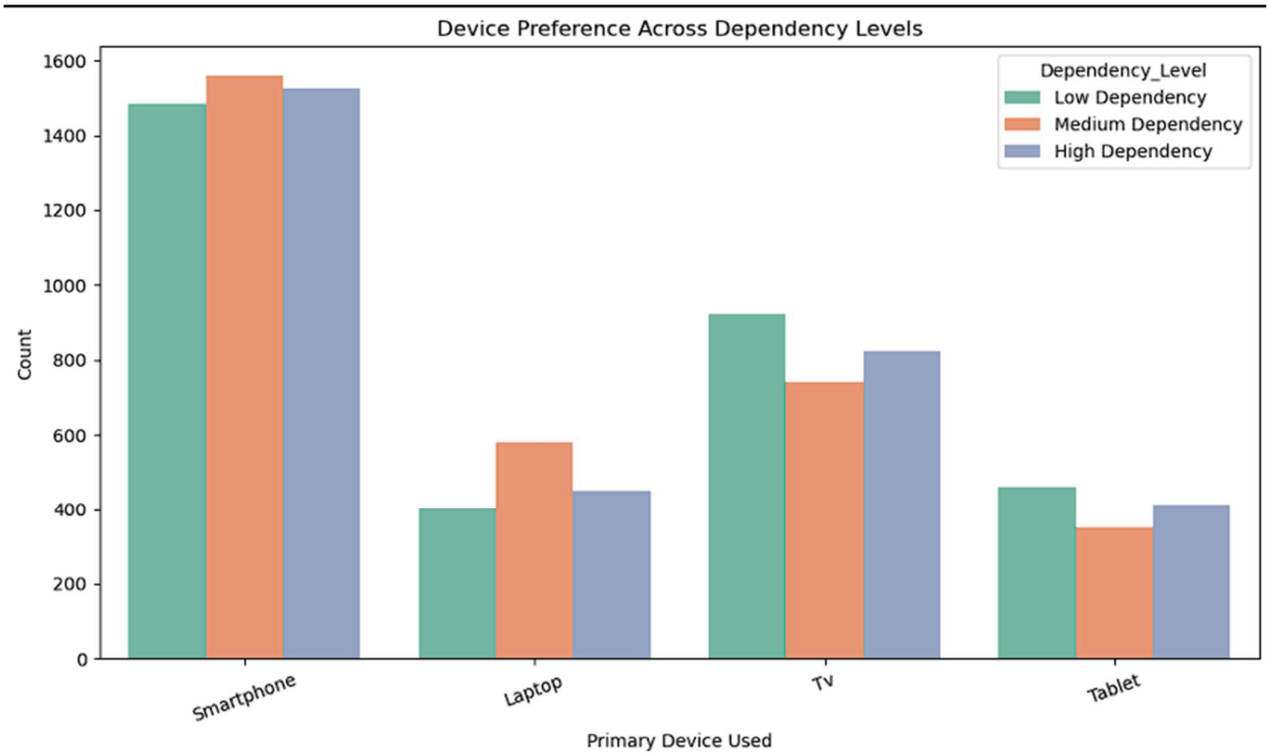
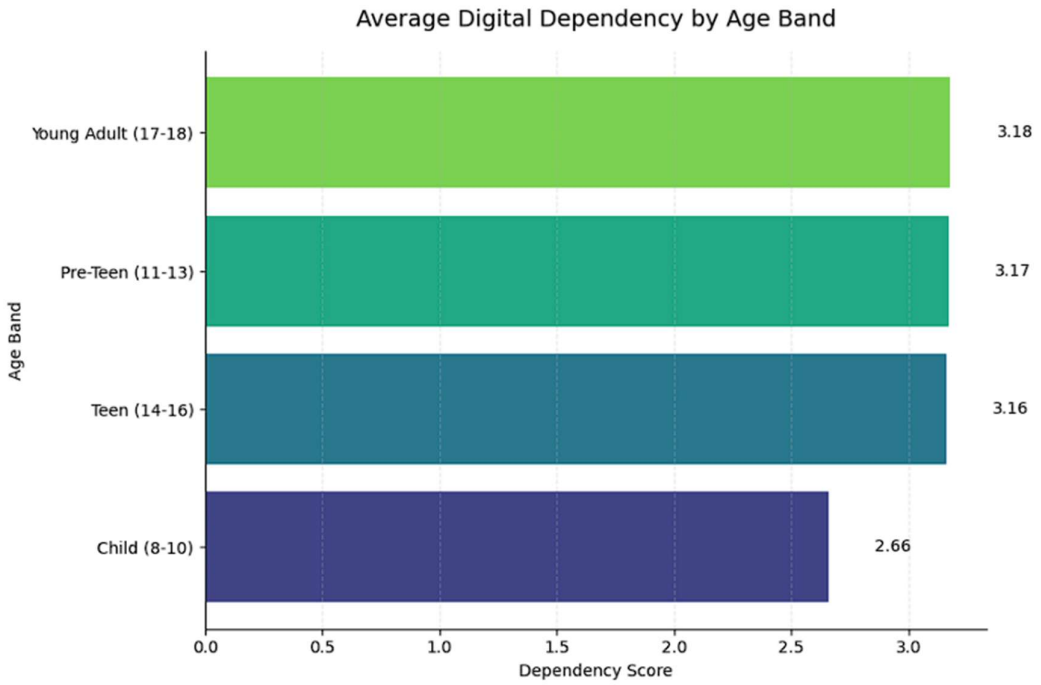


Figure 10: Average Dependency Score by Age Band (Horizontal Bar Chart)

This bar chart highlights how dependency changes with age.
Older age bands show higher digital dependency, which aligns with increased recreational and academic screen usage.



CONCLUSION

Week 5 and Week 6 deepened the analysis of children's digital habits through segment-level comparisons and dependency modeling.
Key insights include:

- Older children and teenagers show significantly higher screen use and dependency scores.
- Boys have slightly more high screen-time cases compared to girls.
- Smartphones dominate as the most-used device across all age groups.
- Urban children face higher digital health impacts and dependency levels.
- Dependency increases steadily with age, driven by both recreational and academic usage.

These findings provide a strong foundation for final reporting, dashboard creation, and recommendations to improve digital balance among children.