

Unlocking The Impact of Weekday Duration Dynamics on Campaign Performance

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Note on Visualizations:

All visual representations, including a dashboard used to support the analysis in this report, are provided in a separate file titled "[Dashboard - Weekday Duration Dynamics on Campaign Performance]." This complementary document includes detailed visuals that illustrate key findings, such as campaign performance comparisons, session duration trends, and traffic source breakdowns. For a comprehensive understanding, readers are encouraged to review the visual data alongside this report.

1. Executive Summary

This report analyses the performance of marketing campaigns for the Google Merch Shop from November 1, 2020, to January 31, 2021. Key findings include:

- **Top-Performing Campaigns:** The Black Friday campaign realised the highest conversion rate, 36.7%, and weekend engagement, while the Holiday campaign had the highest ROI, 128.68%.
- **Engagement Insights:** Sessions lasting from 5 to 30 minutes were associated most with revenue, and weekdays generally saw more engagement than weekends, except for Black Friday, which did best on the weekends.
- **Traffic Sources:** Free search led to the most traffic; referral activity for the Holiday campaign was strong.
- **Bounce Rates:** Bounce rates were under 45%, which means decent retention; however, the number of sessions less than 10 seconds needs attention.
- **Device Performance:** Engagement across devices did not have huge differences, although some campaigns performed slightly better either on desktop or mobile.

Recommendations:

- Take successful strategies in Black Friday and Holiday to other campaigns for optimisation.
- Enhance user experiences to increase session durations, particularly the 5–30 minute range.
- Lower the bounce rate by improving page design and content relevance, among other things.
- Make ad spending match times of highest engagement: for most, this is weekdays; for Black Friday, it's during weekends.
- Rebuild New Year and Data Share Promo campaigns, considering their worst performance in ROI and conversion rates.

2. Project Background

Online advertising and consumer behaviour are not static but dynamic, influenced by various factors. By investigating these factors, campaign optimisation can be achieved **(1)**. For instance, the timing of an advertisement can significantly impact consumer responses. Research indicates that in certain industries, specific hours and days, such as weekdays or weekends, can lead to higher conversion rates, leading to increased revenue **(2)**. Another crucial factor is the type of device used to access digital platforms. Users may engage with ads from different devices. By analysing traffic sources and user preferences, campaigns can be tailored to a seamless user experience, across the devices that have the largest user base **(3)**. Session duration is a powerful metric for understanding campaign performance on digital platforms **(4)**. Typically, longer session durations indicate higher user engagement and satisfaction, which can lead to improved retention and revenue. Conversely, if users spend significantly less time on a particular feature, it may signal the need for improvement.

This report explores these aspects using an e-commerce dataset provided by the educational entity, from Google Analytics data for the Google Merch Shop—an online store selling official Google-branded merchandise such as apparel, accessories, and other products.

The marketing team is particularly interested in understanding if users tend to spend more time on the website on specific weekdays and how this behaviour varies across four campaigns. This leads to the following objectives:

1. Analyse the performance of marketing campaigns using key engagement metrics.
2. Identify patterns in user behaviour across timeframes and devices.
3. Evaluate the relationship between user engagement and revenue.

3. Approach

3.1 Problem

The dataset utilized does not include a direct measurement for engagement. Therefore, engagement is defined as the duration of a user session. Based on this definition and the business task to uncover trends across all marketing campaigns, this analysis focuses on answering the following questions:

1. Which campaigns drive the highest number of sessions and user engagement?
2. Which campaigns perform best in terms of conversion rates and bounce rates?
3. How do engagement metrics vary between weekdays and weekends?
4. What are the primary traffic sources?
5. What is the relationship between user engagement and revenue?

3.2 Prepare and Process

The analysis utilised two main datasets, *Table 1* and *Table 2*, accessed via Google BigQuery.

Table 1 contains fields such as event date, timestamp, event value in currency, user ID, traffic source, device type, and campaign. Campaigns included in this table are Referral, <Other>, Data Share Promo, NewYear_V1, BlackFriday_V1, NewYear_V2, BlackFriday_V2, Holiday_V1, Holiday_V2, and Data Deleted.

Table 2 provides information on impressions, clicks, and costs for each campaign.

Since the dataset lacked explicit user sessions—a key metric in Google Analytics—custom sessions were created using SQL on BigQuery. A session was defined as 30 minutes of uninterrupted activity, meaning a user could have multiple sessions in one day (5). Sessions involving more than one campaign were assigned a primary campaign. Sessions were further categorised based on duration: *Engaged Sessions* (sessions lasting longer than 10 seconds) and *Bounce Sessions* (sessions lasting 10 seconds or less).

Bounce sessions were excluded from analyses, except for bounce rate calculations. To streamline the analysis, all versions of campaigns (e.g., NewYear_V1 and NewYear_V2) were consolidated where necessary, ensuring consistency across metrics, and “Other” was defined as the normal e-commerce activity.

3.3 Analysis

The data analysis and visualisation were performed using Power BI. Key performance indicators (KPIs) were calculated using DAX (Data Analysis Expressions) to gain insights into campaign performance. The main KPIs defined and analysed include:

1. **CTR (Click-Through Rate):**
The percentage of users who clicked on an ad or link out of the total who saw it.
2. **CPM (Cost Per Mille):**
The cost for 1,000 ad impressions in a marketing campaign.
3. **CPA (Cost Per Acquisition):**
The cost required to acquire one customer or conversion.
4. **ROAS (Return on Ad Spend):**
The revenue earned for every dollar spent on advertising.
5. **ROI (Return on Investment):**
The overall profitability of an investment relative to its cost, is expressed as a percentage.
6. **Conversion Rate:**
The percentage of users who completed a purchase out of the total visitors.
7. **Bounce Rate:**
The percentage of visitors who left the website within 10 seconds.

To calculate session time duration, the median was chosen as the preferred metric. While both average and median session lengths can provide valuable insights into website traffic, the median is less affected by extreme values, such as users with exceptionally long

or short sessions **(6)**. This ensures the median offers a more accurate representation of a typical user's session duration. Moreover, in this analysis, the campaigns differ significantly in the number of user sessions, which makes averages less directly comparable across campaigns.

3.4 Results

Between 2020-11-01 and 2021-01-31, a total of 144,000 user sessions were recorded. During this period, the average ROI was 15.92%, with total revenue amounting to approximately \$322,000. Notably, the campaigns did not run for the same duration. For instance, the Data Share Promo campaign ran almost throughout the entire period, whereas others were more limited in scope.

The Black Friday campaign achieved the highest conversion rate of 36.7% and the lowest bounce rate of 11.8%, followed by the Holiday campaign, which had a conversion rate of 17% and a bounce rate of 16.1%. In terms of ROI, the Holiday campaign stood out with the highest return on investment at 128.68%.

Specific campaigns drove higher engagement compared to regular e-commerce traffic. The Black Friday campaign had the highest engagement, particularly on Sundays, with a median session duration of 41 minutes. In contrast, the peak engagement for other campaigns occurred on Wednesdays. However, for all campaigns, the majority of sessions lasted less than 10 minutes. When comparing weekends to weekdays, the most significant difference was observed in the Black Friday campaign, which demonstrated noticeably higher engagement during weekends.

A positive relationship between session duration and revenue was evident. While longer sessions generally correlated with higher revenue, the critical group for revenue generation was sessions lasting between 5 and 30 minutes.

No clear differences in engagement were observed across device types. Some campaigns showed higher median session durations on desktops, while others performed better on mobile or tablet devices.

Lastly, traffic sources varied by campaign. The majority of users arrived at the e-commerce platform through unpaid search for campaigns such as Black Friday, Data Share Promo, and New Year, contributing approximately 55–60% of the traffic. However, for the Holiday campaign, referral sites accounted for about 56% of the traffic.

4. Conclusion

In conclusion, this analysis highlights the importance of tailoring campaigns to specific days of the week, as weekdays generally yield higher user engagement and performance, with the notable exception of Black Friday, which performs exceptionally well on weekends.

Among the campaigns analysed, Black Friday and Holiday campaigns stand out for their superior engagement, return on investment, and conversion rates. While these campaigns drive higher conversions, their bounce rates are similar to periods without active campaigns. However, the bounce rates remain below the 45% threshold commonly regarded as suboptimal in the e-commerce industry, indicating a reasonably strong user retention overall (7).

5. Recommendations

Having all that in mind it is recommended to:

- **Prioritize High-Performing Campaigns:**
Focus on campaigns like Black Friday and Holiday, which drive the highest engagement and revenue. Investigate the strategies that contributed to their success and replicate similar approaches in other campaigns to enhance their performance.
- **Encourage Longer Engagement:**
Create personalized content and user experiences designed to increase session duration, and test these strategies using A/B testing. Focus particularly on the critical 5–30 minute engagement window, which has proven to be most impactful for driving revenue generation.
- **Address Bounce Rates:**
Investigate the causes of sessions lasting less than 10 seconds. Improvements in page design can help reduce bounce rates.
- **Optimize for Timing:**
Align promotions and ad spending with high-engagement periods, particularly weekdays for most campaigns, and weekends for Black Friday, to maximize reach and impact.
- **Reevaluate Underperforming Campaigns:**
Reassess the cost-effectiveness of campaigns with low engagement, particularly focusing on the cost of acquisition for those with negative ROI and low conversion rates, such as the New Year and Data Share Promo campaigns.

6. References

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