University of Exeter Business School

Assignment Cover Sheet	
Candidate Number	021199
Module Code	BEMM461
Module Name	Analytics and Visualisation for Managers and Consultants
Assignment Title	Case Study Visualisation

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Fan Engagement Analysis Dashboard Report

1. Introduction

Fan engagement has become a critical performance indicator for sports organisations, media broadcasters and commercial sponsors. With the rapid expansion of digital platforms, supporters interact with matches, highlights, and behind-the-scenes content across multiple channels in real time. Understanding these patterns is essential for optimising audience engagement, strengthening brand relationships, and improving the effectiveness of content strategies

Social media has become a powerful platform for sports clubs to build online communities, increase visibility, and create emotional engagement among supporters. Understanding how fans interact with different types of content allows clubs and rights-holders to optimise their communication strategies and strengthen fan loyalty.

This report analyses social media engagement data during the football season (Nov–Dec 2022). The focus is to evaluate performance across content types, identify engagement trends, and understand fan sentiment. These insights are translated into an interactive Tableau dashboard designed for strategic decision-making.

Research Question:
How do engagement patterns vary across content types, sentiment categories, and time periods during the club's social media activity?

2. Data Preparation and Cleaning

The data was already quite clean, so there wasn't much heavy cleaning needed. I opened both files in Excel first just to see how they looked. There were a few blank cells, but this is normal with social media data, so I left them as they were. Filling them in would mean creating data that wasn't actually there.

One thing I noticed was that the two datasets had slightly different formats. The FIFA World Cup file was in CSV format and the NBA tweets file was also CSV, but the column names and date formats were not the same. I just opened them in Excel, and Excel automatically recognised the timestamps, so I didn't need to do much there.

There were also some engagement values that looked very high, but outliers on social media are common, especially during major sports events, so I kept everything. Some sentiment labels were different between the files, but they were still understandable so I didn't change them.

To make the analysis easier, I created a new column for the date (without the time) so that I could group activity by day and week. After that, both datasets were merged into one combined file, which made it much simpler to work with instead of dealing with two separate files.

Datasets Used:

- fifa_world_cup_2022_tweets.csv **(**FIFA World Cup fan tweets)
- NBADataset - 12-07-2020 till 19-09-2020.csv (NBA fan tweets)

These were merged into one consolidated dataset for analysis and visualisation.

3. Exploratory Data Analysis

The combined dataset was first explored to understand its structure, scale, and key variables. After merging both files, the dataset contained over 70,000 tweets, including tweet text, sentiment labels, engagement metrics (likes, retweets, replies), posting time, and content type.Initial analysis in Excel revealed that engagement was highly skewed. The average engagement per tweet was approximately 24 interactions, while the maximum engagement exceeded 316,000, and many tweets recorded zero engagement. This large gap between average and maximum values indicates the presence of extreme outliers and confirms that a small number of posts attracted disproportionately high attention. This insight motivated the use of distribution-focused and concentration-based visualisations in the dashboard rather than relying solely on averages.Temporal exploration showed that tweets were most frequently posted in the evening hours, aligning with live sports events and match discussions, while morning activity was relatively low. Sentiment analysis indicated that neutral sentiment dominated, followed by positive sentiment, with negative sentiment forming the smallest share. This suggests that most fan interactions were informational or reactive rather than strongly emotional.Daily activity also varied considerably, with clear spikes occurring during major FIFA World Cup and NBA events, while quieter days showed substantially lower engagement. These patterns demonstrate that fan engagement is strongly event-driven rather than evenly distributed over time.

AI-assisted tools were used during the exploratory phase to support idea generation and initial interpretation; however, all AI-generated insights were critically evaluated against the actual dataset and dashboard outputs. In several cases, AI explanations initially attributed engagement spikes primarily to sentiment alone. Closer inspection of the data showed that these peaks were more closely linked to high-profile events, content type, and viral posts, rather than sentiment in isolation. Similarly, AI summaries tended to understate the importance of engagement concentration, whereas direct analysis clearly showed that a small number of posts accounted for a large proportion of total engagement. These differences highlight the importance of human judgement in validating AI outputs. All final interpretations presented in this report are therefore grounded in direct evidence from the dataset and visualisations rather than unverified AI assumptions.

4. Dashboard Development

The dashboard was created using Tableau Public due to its widespread industry use for building interactive and professional analytical dashboards. Compared to tools such as Excel, Power BI, or Python visualisation libraries, Tableau offers a more intuitive drag-and-drop interface that enables complex visualisations to be created efficiently without extensive coding. Its automatic recognition of data types, including dates, categories, and numerical measures, allowed meaningful charts to be produced with minimal data preparation.

Tableau was particularly well suited for the four visualisations included in the dashboard. The daily fan engagement trend effectively displays time-based patterns and sharp spikes in activity, while the fan sentiment distribution allows users to interactively explore how positive, neutral, and negative sentiment relate to engagement. The fan engagement by content type visualisation uses aggregation and reference lines to compare content categories against the average engagement level, clearly highlighting performance differences. The engagement concentration visualisation demonstrates how a small number of posts contribute disproportionately to total engagement, which Tableau supports through combined bar and line views.

A key strength of Tableau is interactivity. Selecting a sentiment category or content type automatically updates all four visualisations, allowing users to explore relationships between engagement, sentiment, and content without technical expertise. In addition, Tableau's formatting and layout tools helped create a clean, industry-standard dashboard suitable for professional sports analytics reporting. Overall, Tableau was the most appropriate tool because it combines clarity, interactivity, and presentation quality, enabling insights to be communicated effectively to non-technical stakeholders.

Visualisation 1 – Daily Fan Engagement Trend

Daily Engagement Trend
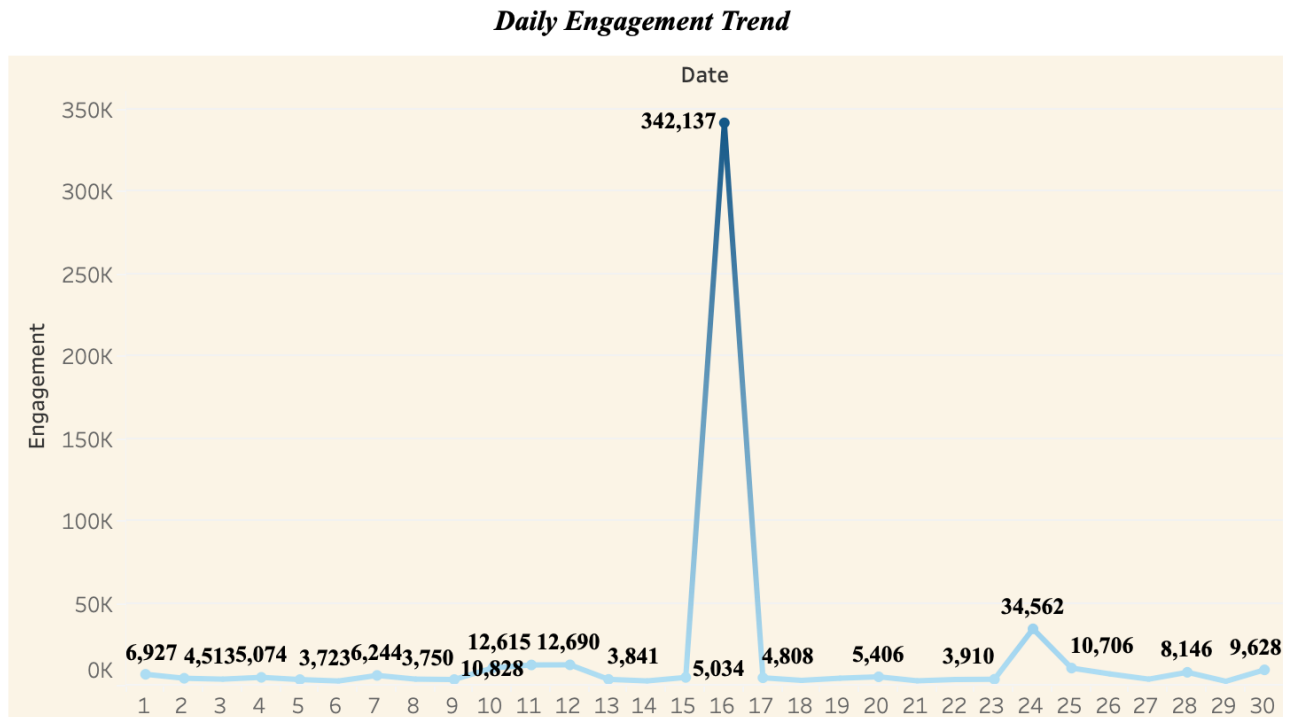
The first visualisation is a line chart showing daily fan engagement, calculated by aggregating total interactions (likes, retweets, and replies) for each day. This chart illustrates how fan activity changes over time and helps identify periods of unusually high or low engagement. A line chart is appropriate for this analysis because it clearly represents time-based trends and makes engagement fluctuations easy to interpret.

The visualisation reveals several sharp spikes in engagement on specific days, indicating moments that attracted heightened fan attention, such as major matches, announcements, or viral content. In contrast, smaller variations across the timeline represent normal levels of fan interaction. Displaying engagement values allows direct comparison between days and helps quantify the magnitude of these peaks.

This visualisation is valuable for sports organisations and marketers as it highlights when fans are most active, supporting decisions related to content scheduling, campaign timing, and event-driven engagement strategies.

Visualisation 2 – Fan Sentiment Distribution

Fan Sentiment Distribution
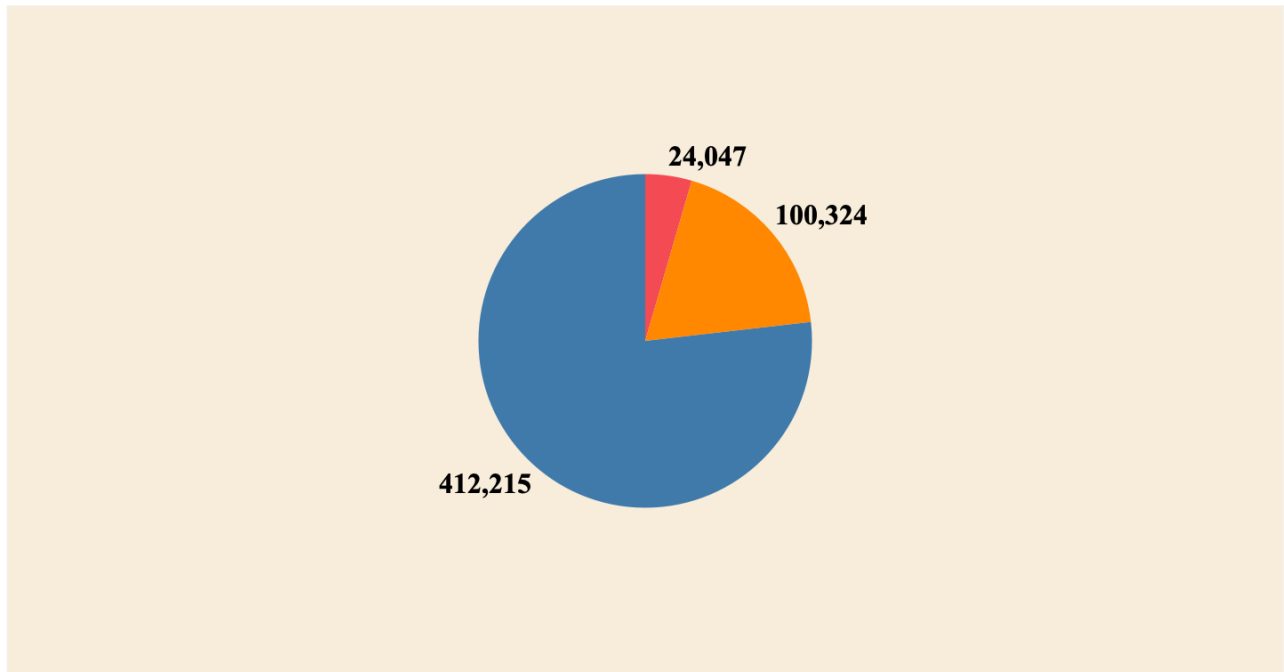
The second visualisation is a pie chart showing the overall distribution of fan sentiment across positive, neutral, and negative categories. This chart summarises how fans emotionally responded to content over the full analysis period. A pie chart is appropriate because it clearly displays proportional differences, making it easy to identify which sentiment dominates overall engagement.

The visualisation shows that positive sentiment accounts for the largest share of total engagement, followed by neutral sentiment, while negative sentiment represents a relatively small proportion. This indicates that most fan interactions were favourable or informational rather than critical. Including numerical labels supports accurate comparison between sentiment categories while maintaining a simple visual structure.

This visualisation is important for understanding the overall fan atmosphere, as sentiment plays a key role in shaping engagement and brand perception. By providing a clear snapshot of audience mood, the chart helps organisations quickly assess whether fan reactions are generally supportive, neutral, or negative.

Visualisation 3 – Fan Engagement by Content Type

Fan Engagement by Content Type
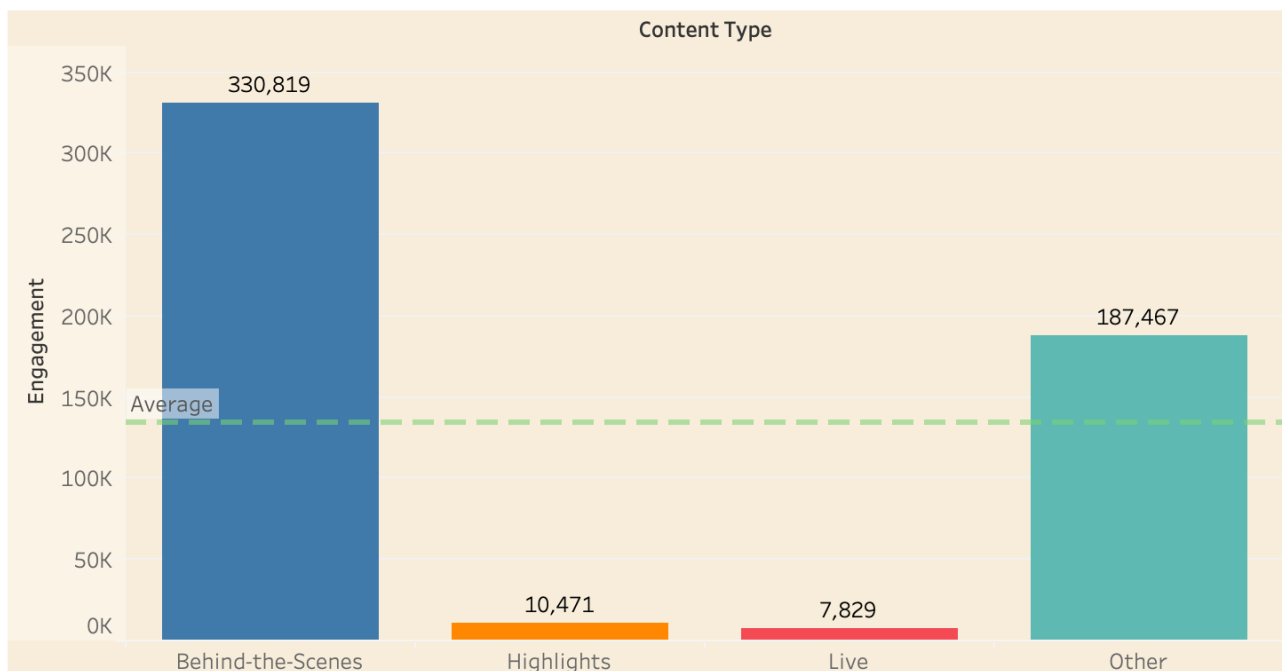
The third visualisation is a bar chart comparing total fan engagement across different content types, including behind-the-scenes, highlights, live content, and other posts. A bar chart is an appropriate choice because it allows clear side-by-side comparison of engagement levels across categories.

The results show that behind-the-scenes content generates the highest engagement, with over 330,000 interactions, indicating strong fan interest in exclusive or personal content. The "Other" category also performs well, with approximately 187,000 interactions, suggesting that non-standard or flexible content formats can still attract substantial engagement. In contrast, highlights and live content receive significantly lower engagement, likely because such content is widely available across multiple platforms and therefore less distinctive.

An average engagement reference line is included to provide context, showing that only behind-the-scenes and other content exceed the overall average. This visualisation offers clear, actionable insight for sports organisations by highlighting which content types are most effective for driving fan engagement.

Visualization 4 – Engagement Concentration

Engagement Concentration
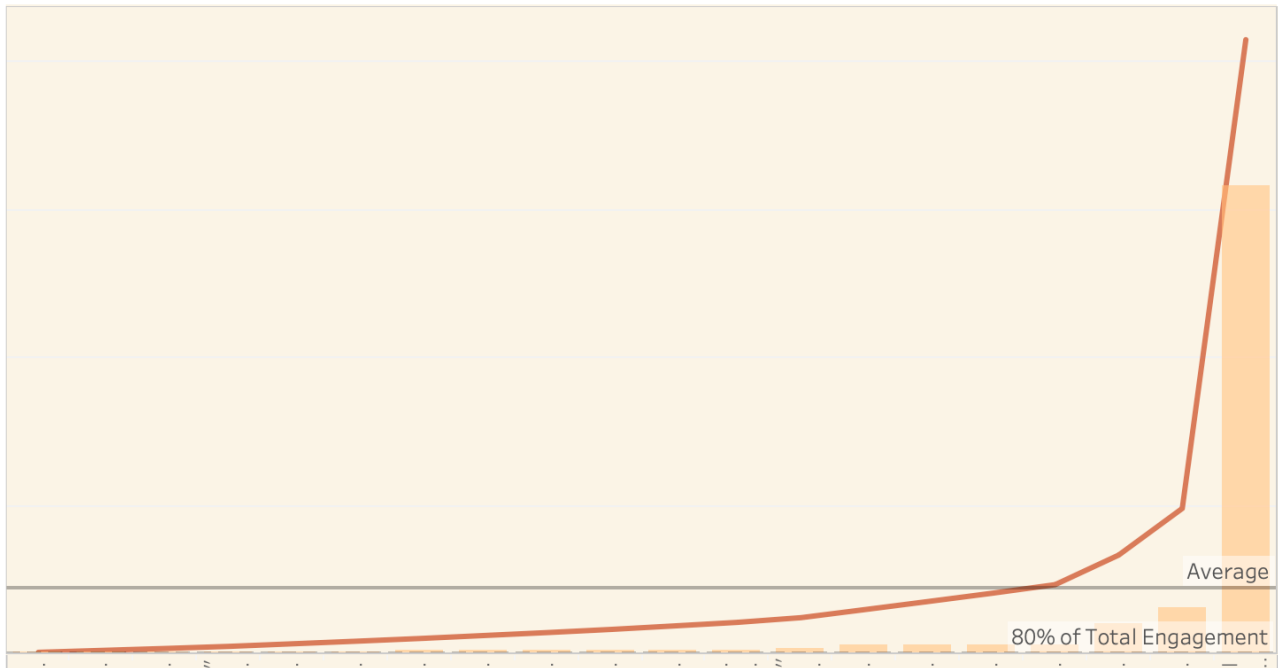
The fourth visualisation analyses how fan engagement is distributed across individual social media posts, examining whether engagement is evenly shared or concentrated among a small number of high-performing posts. The chart ranks posts by total engagement, with bars showing engagement per post and a cumulative line illustrating how overall engagement builds as additional posts are included.

The visualisation reveals a clear concentration pattern, where a small number of posts account for a large proportion of total engagement, while most posts contribute relatively little. This indicates that fan engagement is highly skewed and driven primarily by viral or highly resonant content. The 80% reference point further highlights that the majority of engagement is generated by a limited subset of posts.

This visualisation is valuable because it demonstrates that sports fan engagement is shaped by standout moments rather than consistent performance across all content. By focusing on the distribution of engagement, it complements the other dashboard views and provides deeper insight into how attention is allocated across posts.

Dashboard Interaction and Filters
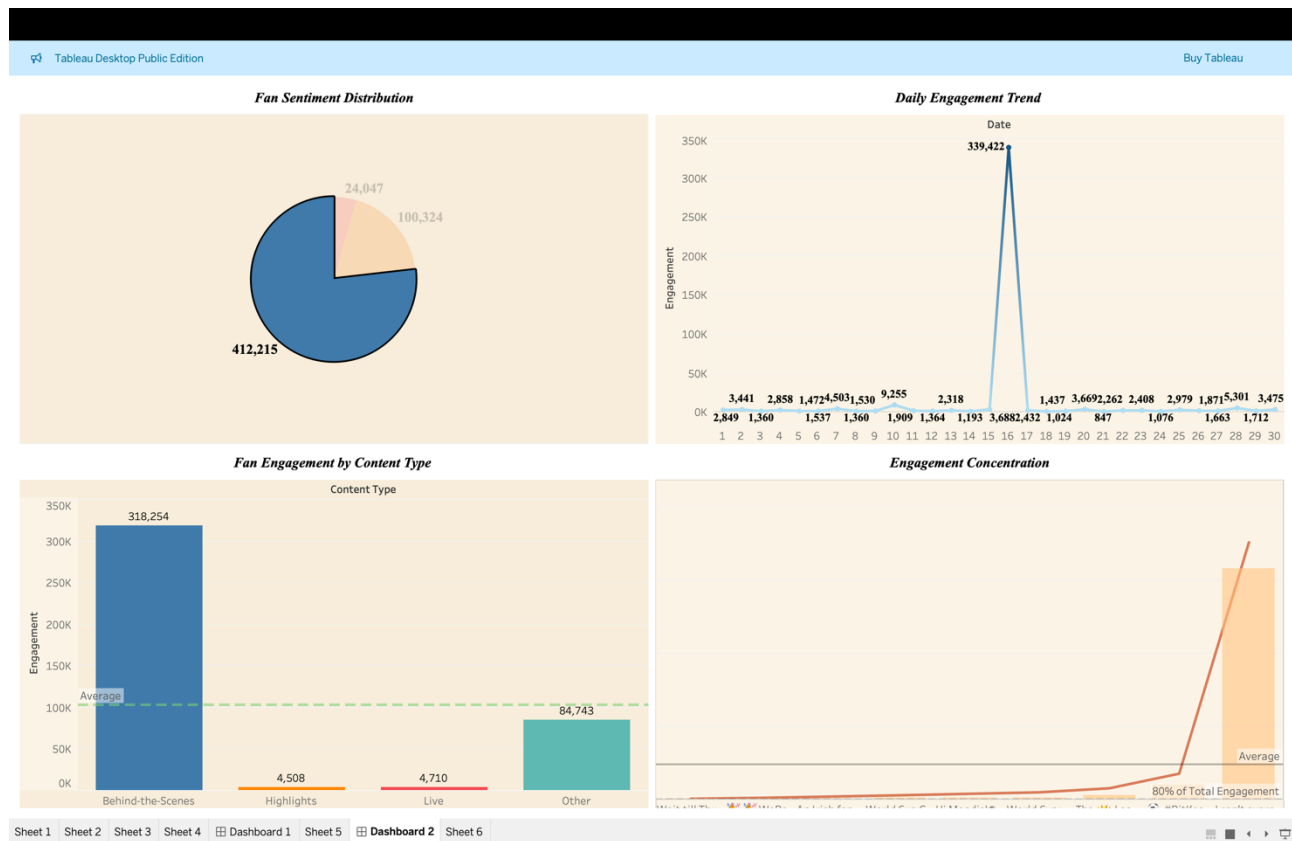
Screenshot 1: Initial Dashboard View
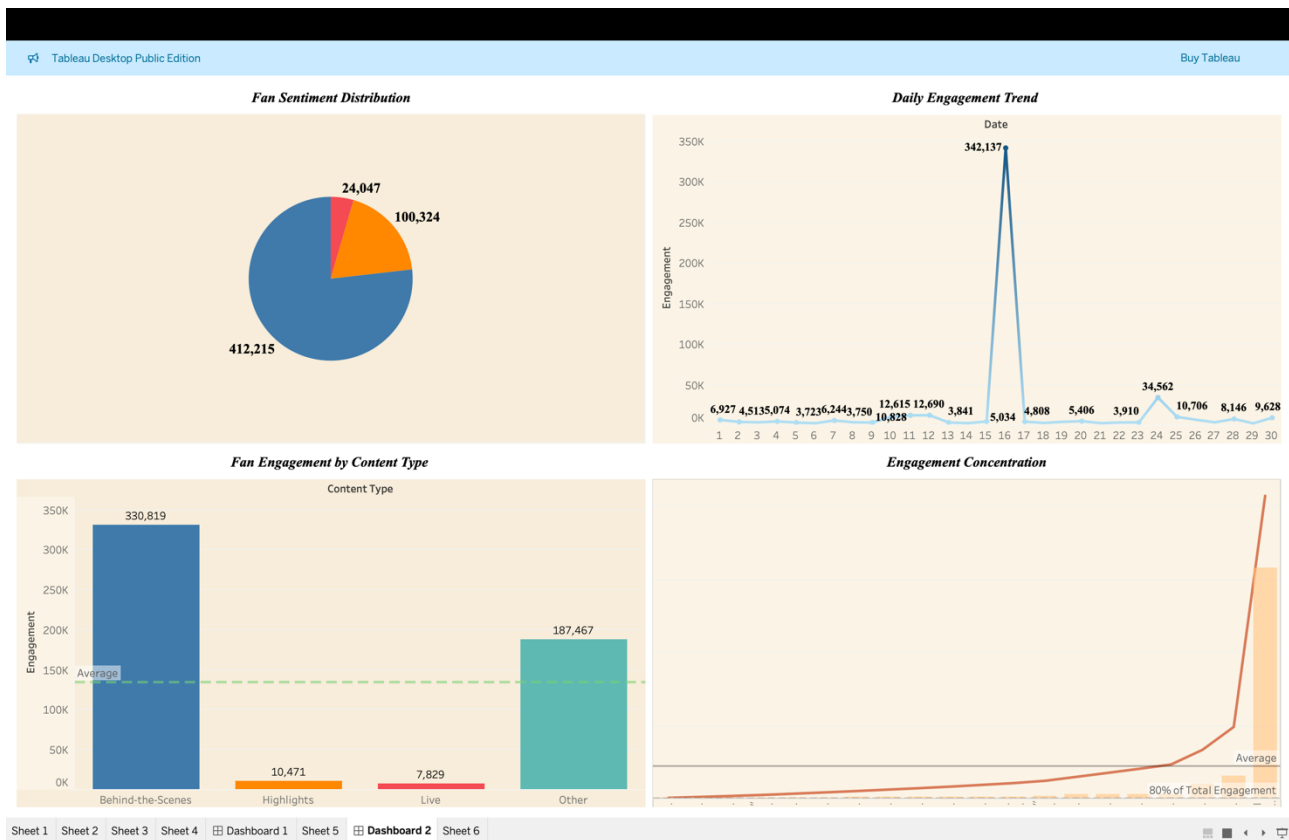
This screenshot shows the dashboard in its default state when it is first opened, with no filters applied. All available data from the combined datasets is displayed across the four visualisations.

At this stage, the dashboard provides an overall summary of sports fan engagement. The Fan Sentiment Distribution chart shows the proportion of positive, neutral, and negative sentiment across all posts. The Daily Engagement Trend presents total engagement over time, highlighting overall peaks and fluctuations. The Fan Engagement by Content Type bar chart compares engagement across different content categories, while the Engagement Concentration visualisation illustrates how engagement is distributed across individual posts.

This initial view is useful for gaining a high-level understanding of overall patterns in fan sentiment and engagement before narrowing the analysis to specific subsets of the data.

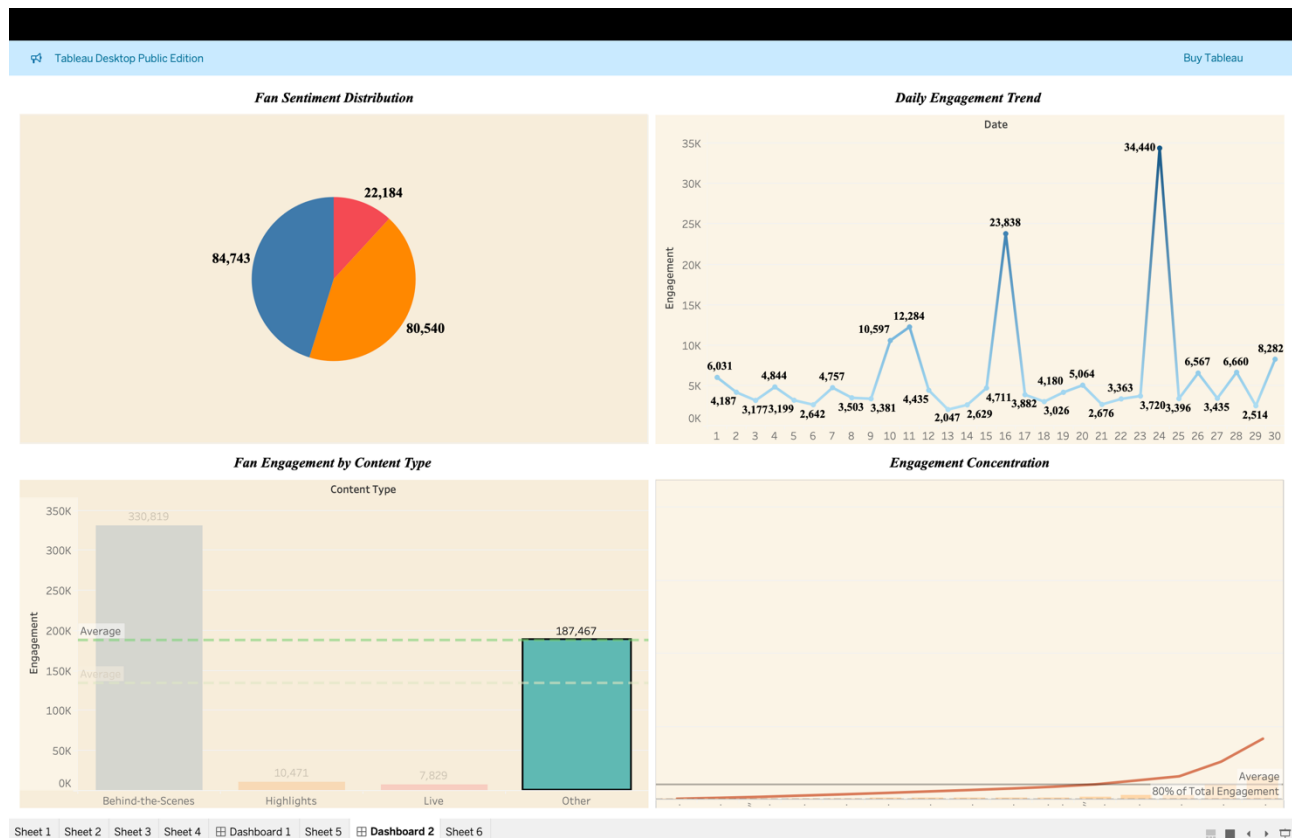Screenshot 2: Dashboard with Positive Sentiment Filter Applied

This screenshot shows the dashboard after applying a positive sentiment filter from the sentiment distribution visualisation. Selecting this segment updates all charts to display engagement patterns associated only with positive fan reactions.

The daily engagement trend reveals fluctuations and clear spikes, indicating moments of heightened fan enthusiasm. The engagement by content type visualisation shows that behind-the-scenes content continues to generate the highest levels of positive engagement compared to highlights and live content. The engagement concentration view further demonstrates that even within positive sentiment, a small number of posts account for a large share of total interactions.

This filtered view enables focused analysis of positive fan behaviour, helping stakeholders identify which content types and timings are most effective at generating favourable audience engagement.

Screenshot 3: Dashboard with Content Type Filter

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This filtered view enables focused analysis of positive fan behaviour, helping stakeholders identify which content types and timings are most effective at generating favourable audience engagement.

5. Key Findings and Insights

Based on the analysis presented in the interactive dashboard, several key insights emerge regarding sports fan engagement and sentiment patterns across online content.

The interactive dashboard reveals several important patterns in sports fan engagement and sentiment. Overall fan sentiment is predominantly positive, with positive posts generating the highest share of total engagement compared to neutral and negative content. This indicates that fans are more likely to interact with emotionally expressive and supportive messages.

Engagement levels also vary significantly over time. While most days show relatively stable activity, the daily engagement trend highlights sharp spikes on specific dates. These peaks suggest

that fan engagement is largely event-driven, increasing around major matches, tournaments, or high-profile sports news rather than remaining consistent over time.

Content type has a strong influence on engagement. Behind-the-scenes content generates the highest engagement, followed by other content categories, while live updates and highlights receive comparatively lower interaction. This suggests that fans place greater value on exclusive or insider-style content than on standard match coverage.

Finally, engagement is highly concentrated across posts. A small number of posts account for a large proportion of total engagement, showing that only a few high-impact posts drive most interactions. This confirms that sports fan engagement on social media is unevenly distributed.

Overall, the findings show that sports fan engagement is shaped by sentiment, timing, and content strategy. Positive, emotionally engaging posts shared around key sporting events—particularly behind-the-scenes content—are most effective in generating high levels of interaction.

6. Reflection

The final dashboard effectively meets the aims of the analysis by clearly presenting patterns in sports fan engagement across sentiment, time, content type, and individual post performance. The four visualisations work together cohesively and are easy to interpret, allowing users to explore the data interactively through simple filtering actions. This interactivity enhances understanding by enabling stakeholders to focus on specific sentiments or content categories and immediately observe how engagement patterns change.

One of the main challenges during this project was becoming comfortable with Tableau, particularly when applying filters, managing layout design, and ensuring consistency across all visualisations. Selecting appropriate chart types also required careful consideration to ensure that each visualisation contributed unique insight rather than repeating information. Designing a clean and balanced dashboard layout was another key learning point, as effective presentation is just as important as accurate analysis.

A key takeaway from this project is that dashboard development is an iterative process that involves both analytical reasoning and visual design skills. Through experimentation and refinement, the final dashboard successfully answers the research objective by demonstrating how fan engagement is influenced by sentiment, timing, and content strategy. Overall, the project strengthened my understanding of how interactive visual analytics can be used to communicate complex data insights in a clear and professional manner.

7. Conclusion

This analysis provides valuable insights into how sports fans engage with online content across sentiment, time, content type, and individual posts. By integrating multiple data sources into an interactive Tableau dashboard, the study enables users to explore engagement patterns dynamically and identify the key drivers of fan interaction.

The findings show that fan engagement is strongly influenced by sentiment and content strategy. Positive sentiment dominates overall engagement, and engagement levels tend to spike around specific events rather than remaining consistent over time. Behind-the-scenes content generates significantly higher engagement compared to live updates and highlights, indicating that fans value

exclusive and personal content. Additionally, engagement is highly concentrated, with a small number of posts accounting for a large proportion of total interactions.

Based on these insights, several practical recommendations can be made for sports rights-holders, broadcasters, and sponsors. Content strategies should prioritise emotionally positive messaging and behind-the-scenes content to maximise fan interaction. Posting activity should be aligned with key sporting events to capitalise on periods of heightened fan attention. Monitoring high-performing posts can also help organisations identify successful engagement patterns and replicate them in future campaigns.

Overall, the dashboard serves as a useful decision-support tool for understanding and monitoring sports fan engagement. Its interactive design allows stakeholders to explore audience behaviour from multiple perspectives, making it suitable for ongoing analysis, strategic planning, and optimisation of digital engagement strategies.

8. References

Tirendaz Academy. (2022). *FIFA World Cup 2022 tweets dataset* [Data set].
Kaggle. https://www.kaggle.com/datasets/tirendazacademy/fifa-world-cup-2022-tweets

Wjia26. (2020). *NBA tweets dataset (12-07-2020 to 19-09-2020)* [Data set].
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