



# Analysis Of User Engagement Metrics On Instagram

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**Abstract:** This study examines user engagement patterns on Instagram by analyzing secondary data from past campaigns and publicly available platform insights. It explores how different content formats, caption styles, hashtags, and posting behavior influence audience interaction across both platforms. Through descriptive analysis and social listening tools, the research identifies trends in engagement and highlights which digital strategies generate the strongest responses. The findings offer practical guidance for improving content performance and designing more effective social media campaigns.

**Keywords:** Social Media Engagement, Instagram Analytics, Hashtag Analysis, Posting Behavior.

## I. INTRODUCTION

Instagram has emerged as one of the most influential social media platforms in the digital marketing ecosystem, driven by its visual-first design, interactive features, and massive global user base. For brands, creators, and businesses, the platform offers a dynamic space to build visibility, communicate identity, and cultivate relationships with audiences. However, the true value of Instagram lies not only in its reach but in how users interact with content. Engagement metrics such as likes, comments, shares, saves, impressions, and profile visits have become essential indicators of how effectively a message resonates with viewers.

As the platform continues to evolve through features like Reels, Stories, carousels, and interactive stickers, user behavior has grown more complex and fast-paced. This shift has made engagement analysis crucial for understanding which content formats capture attention, drive deeper interaction, and encourage repeated user involvement. Beyond the numbers, these metrics provide insights into audience preferences, trends, and sentiment, enabling marketers to make data-driven decisions rather than relying on assumptions.

With increasing competition and algorithm-driven content visibility, analyzing engagement metrics has become a core component of digital strategy. Businesses and researchers alike use these insights to assess content performance, refine creative approaches, optimize posting patterns, and strengthen brand-audience connections. This study focuses on interpreting Instagram engagement metrics to identify patterns, evaluate effectiveness, and explore how different content elements influence user response. Through this analysis, the research aims to highlight the strategic importance of engagement data in improving digital communication, enhancing campaign outcomes, and navigating the constantly evolving social media landscape.

## II. OBJECTIVES OF THE STUDY

The study aims to understand how different content styles, posting behaviours, and creative elements shape audience responses on Instagram. By examining engagement metrics such as likes, comments, shares, saves, and impressions, the research seeks to identify patterns that can help improve digital marketing performance and guide future content strategies.

It also explores how users interact with visually rich formats like Reels and carousels compared to static posts. The analysis highlights the role of caption tone, posting frequency, and hashtag selection in influencing reach and visibility. Overall, the study provides insights that can help brands tailor content to audience preferences and strengthen their presence on the platform.

### Primary Objective

To evaluate the effectiveness of different content formats (posts, stories, and ads) in driving user engagement on Instagram and LinkedIn.

### Secondary Objective

To analyze whether the number of hashtags used has a measurable impact on engagement.

To determine whether video duration influences engagement levels and user interaction across both platforms.

To analyse how caption length impacts engagement rates and audience response patterns.

## III. REVIEW OF LITERATURE

Instagram has been widely recognized as a powerful platform for visual storytelling, allowing brands to communicate identity and emotion through images, videos, and short-form content (Kuligowski, 2023; Demeku, 2023).

Studies highlight that Instagram business accounts offer clear advantages over personal accounts, including access to analytics, targeted advertising tools, and audience insights that support niche engagement strategies (Bagadiya, 2023; McKinsey & Company, 2023).

Research also shows that users respond more strongly to visually rich, aesthetically consistent content, which enhances brand recognition and recall. Cuillierier's work further demonstrates Instagram's ability to support corporate branding by leveraging visual culture, interactive features, and high engagement potential. Overall, the literature positions Instagram as a platform where compelling visuals serve as a bridge between brand identity and consumer perception, making it fertile ground for studying engagement metrics.

A strong stream of research emphasizes the role of influencers and user-generated content in increasing engagement on Instagram. Studies show that influencers shape consumer perception through authenticity, aesthetic consistency, and relatable communication, which strengthens trust and drives interaction (Abidin, 2016; Boerman et al., 2017).

Instagram's format, centered on short-form video, filters, and narrative-driven content, enhances the impact of influencer collaborations and significantly boosts engagement (Campbell & Farrell, 2020).

Additional research highlights Instagram as a space where user and brand-generated content co-create marketing value, and where likes, comments, shares, and saves act as measurable indicators of brand resonance (Hudson et al., 2016). This body of literature supports the idea that Instagram engagement is strongly shaped by social proof, peer influence, and the emotional appeal of content formats.

Research on LinkedIn emphasizes the growing importance of visual communication in professional digital engagement. Kumar and Sharma (2020) demonstrate that images, videos, infographics, and carousel posts significantly increase user engagement, brand recall, and message retention, making visuals a core component of LinkedIn strategy.

Pulizzi (2014) supports this by arguing that effective LinkedIn content must blend professionalism with storytelling, with visuals acting as a bridge between data and emotion. Chaffey (2019) further highlights that LinkedIn's B2B orientation makes visual content essential for reinforcing credibility, expertise, and leadership positioning. Empirical findings by Kapoor et al. (2021) show that consistent visual branding through colour, layout, and typography enhances trust and recognition.

Psychological foundations also support this shift: Paivio's Dual Coding Theory (1971) suggests that processing text and visuals together improves comprehension and memory. Bateman et al. (2017) extend this idea, noting that complex professional information becomes more digestible when framed through visual formats such as infographics or explainer videos. Overall, the literature positions visual content as a decisive factor shaping engagement patterns and visibility on Instagram.

Engagement marketing has become a cornerstone of digital strategies, shifting the focus from one-way promotion to interactive, value-driven relationships between brands and consumers. Brodie et al. (2011) define consumer–brand engagement as a multidimensional construct involving cognitive, emotional, and behavioural participation.

Calder, Malthouse and Schaedel (2009) argue that digital platforms heighten engagement by enabling users to interact, comment, share, and co-create value. Hollebeek et al. (2014) deepen this understanding by showing that frequent, high-quality interactions enhance emotional attachment and strengthen brand relationships.

In social-media contexts, De Vries, Gensler and Leeftang (2012) highlight that engagement metrics function as social proof, shaping perceptions of brand relevance and trustworthiness. Hudson et al. (2016) further demonstrate that digital interactions—likes, comments, story replies, shares—serve as measurable indicators of resonance and influence purchase behaviour. Together, the literature shows that social media engagement is not only a performance metric but a psychological mechanism that drives loyalty, credibility, and consumer decision-making.

#### IV. RESEARCH METHODOLOGY

This study adopts a **secondary data methodology**, relying on publicly available Instagram insights and previously recorded engagement data rather than collecting responses directly from users. Secondary data is particularly effective in social media research because platforms automatically track metrics such as likes, comments, shares, saves, impressions, reach, and hashtag performance. Using this existing data allows for a broad and systematic assessment of engagement behaviour without intervening in user activity.

A **descriptive research design** is used to observe patterns across different content formats and posting styles. The study evaluates how factors such as captions, hashtags, emojis, posting time, and frequency influence audience interaction. To strengthen the data analysis, the research incorporates **Apify's Instagram Hashtag Scraper**, a cloud-based extraction tool that gathers structured public data linked to specific hashtags. Apify provides reliable information on post's performance, trending content, and hashtag frequency, which supports deeper trend analysis and benchmarking.

Social listening tools and Instagram's built-in analytics further support the methodology by offering structured data such as reach, profile visits, and user activity patterns. These tools enhance the accuracy of observations and allow the research to benchmark findings against established digital marketing practices. Overall, the methodology provides a systematic framework to understand engagement behaviour and evaluate the effectiveness of various content strategies.



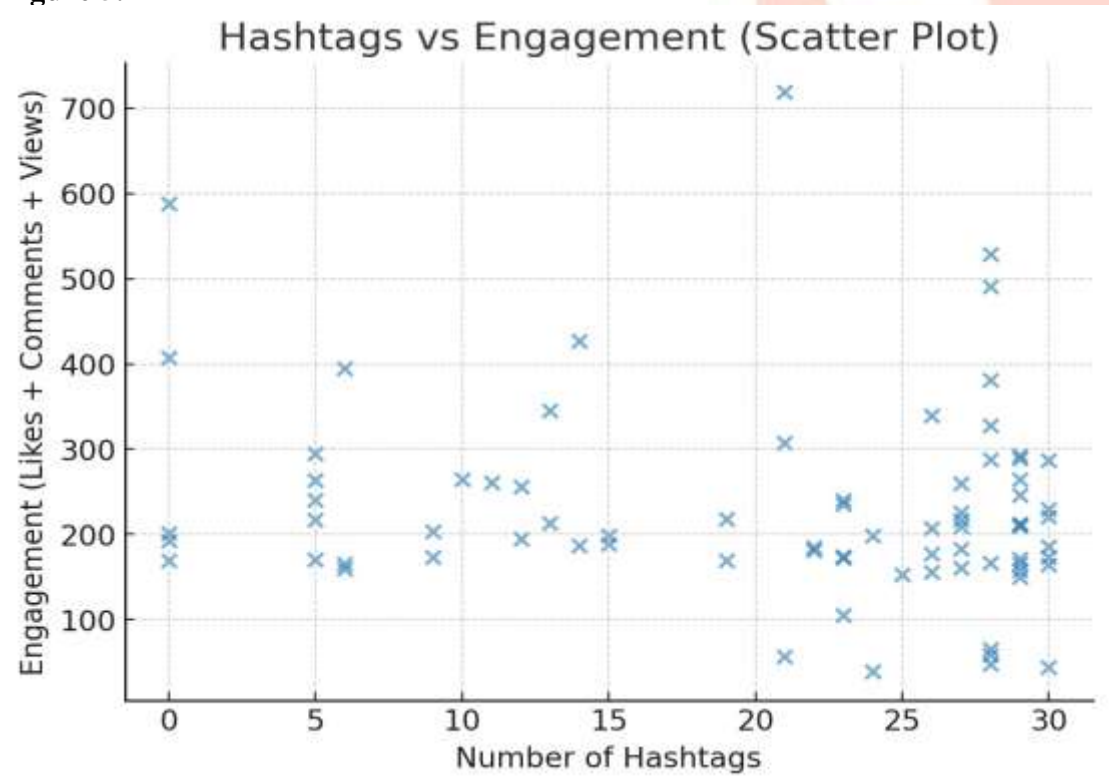
V. DATA ANALYSIS AND INTERPRETATION

Table 5.1: Hashtags vs Engagement

The following diagrams analyse user engagement metrics on the basis of comparison on Number of hashtags used and its proportionate engagement, i.e. Likes, Comments and Views of the Instagram posts.

Hashtag Range	Typical Engagement Range (Likes + Comments + Views)	Observed Trend
0 – 5	150 – 600 (few points near upper 500s)	Engagement varies widely. Some posts with no or very few hashtags still achieved high engagement, indicating other factors at play.
6 – 10	150 – 400	Engagement remains moderate, with no consistent upward movement.
11 – 20	150 – 450	Slight clustering around 180–250, but outliers reach higher engagement.
21 – 25	60 – 300	Engagement is mostly mid-range with occasional dips below 100.
26 – 30	50 – 500 (one outlier ~720)	Wide spread of results. A few posts reach very high engagement, but many remain average or low despite high hashtag count.

Figure 5.1



Scatter Plot

The scatter plot represents individual posts, with the x-axis showing the number of hashtags used and the y-axis displaying the total engagement received, measured through likes, comments, and views. Each dot corresponds to a single post, highlighting how engagement is distributed across different hashtag counts. A wide scatter of dots suggests that the number of hashtags alone does not consistently determine the level of engagement. Some posts with fewer hashtags may still generate higher engagement, while others with many hashtags may not necessarily perform as well. This highlights the role of other influential factors such as

the quality of content, relevance of the hashtags, timing of posting, and audience preferences. The key takeaway from this visualization is that simply increasing hashtag count does not guarantee higher engagement, and hashtags should be strategically combined with strong content and timing to be effective.

Table 5.2: Caption length vs Engagement

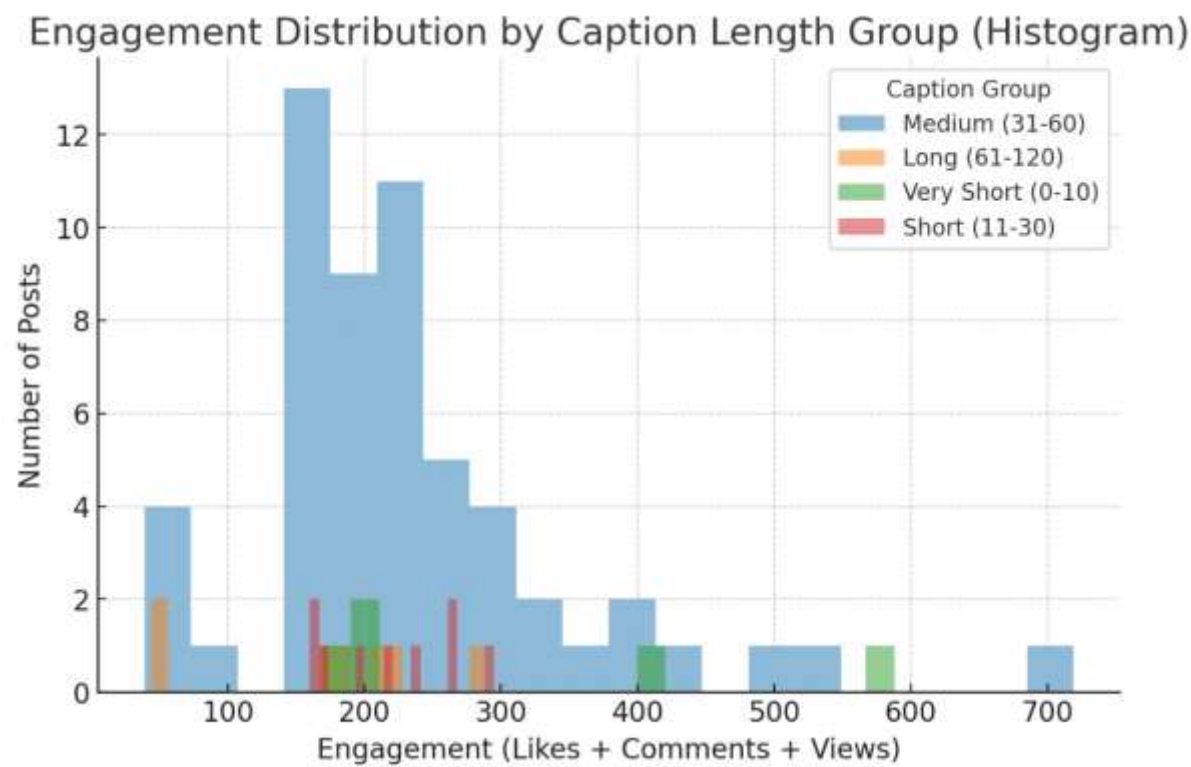
Line Plot

This line plot illustrates the trend of average engagement across caption groups. It shows a noticeable decline in engagement as the captions get longer. The steady downward slope makes it clear that shorter captions drive stronger engagement results.

Engagement steadily decreases as captions grow longer, highlighting that concise captions work most effectively.

Engagement Range	Very Short (0–10)	Short (11–30)	Medium (31–60)	Long (61–120)
0–100	0	0	4	2
100–200	2	2	13	1
200–300	2	2	11	1
300–400	1	1	5	0
400–500	1	0	2	0
500–600	0	0	1	0
600–700	1	0	1	0

Figure 5.2

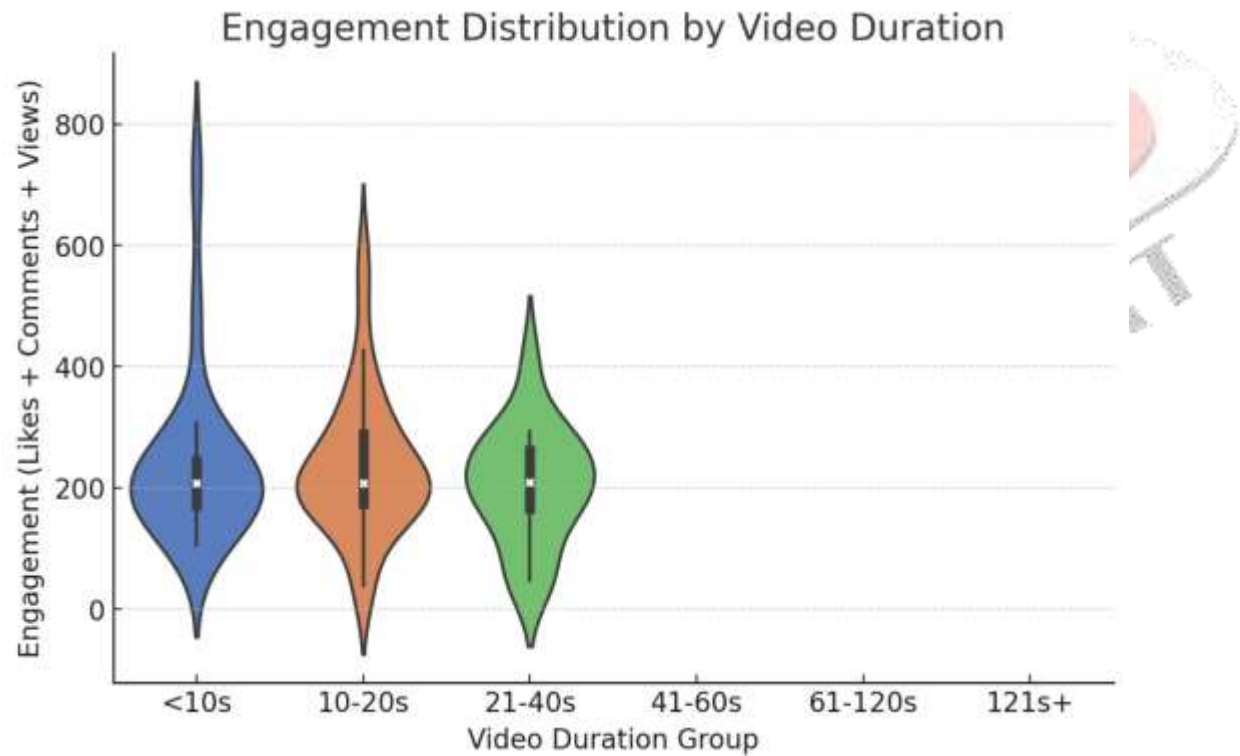


**Table 5.3: Video duration vs Engagement**

This section analyses how the length of videos and reels influences engagement. Video duration was grouped into short, medium, and long categories. Engagement levels were then compared across these duration ranges. The aim is to see whether shorter clips perform better than longer ones in capturing attention.

Video Group	Duration	Engagement Trend (Likes + Comments + Views)	Engagement (Approx.)
<10s		High engagement, stable distribution, strong reliability	~200–300 (some posts up to 800)
10–20s		High engagement, slightly more variation, still strong	~180–280 (some posts up to 600)
21–40s		Moderate engagement, scattered, less predictable	~150–250 (wide spread, lower average)
41–60s		Very low engagement, minimal consistency	~100–150
61–120s		Negligible engagement	<100
121s+		Negligible engagement	<100

**Figure 5.3**



3(a). Violin Plot

The violin plot highlights how engagement levels are distributed across different ranges of video lengths. The results indicate that short clips, especially those under 10 seconds or between 10–20 seconds, tend to achieve higher and more stable engagement. On the other hand, videos in the range of 21–40 seconds generally receive lower average engagement, and their performance is more scattered, making them less predictable.

Short videos consistently deliver stronger and more reliable engagement compared to longer clips. For Example, A reel under **10 seconds** (8.3s, 209 engagements) with the caption “*Jobinte per kettal thalavari varunne? Relax ...*” achieved solid engagement, aligning with the violin plot’s strong cluster for short clips.

In the **10–20 second range**, a reel of 17.7s with 529 engagements and the caption “*Engane click cheythalum angle kittunilla...*” performed as an outlier, explaining the violin plot’s extended upper tail.

For the **21–40 second group**, a 24.8s reel with only 48 engagements and the caption “*Break-up kazhinju mind calm aakkan aayirunnu...*” highlights the sharp drop in performance seen for longer videos.

The data analysis suggests that user engagement on your Instagram posts is shaped more by **content style and delivery** than by simply adding more features such as hashtags or lengthy captions. While hashtags are often considered a way to increase reach, the scatter and line plots showed that adding more hashtags did not consistently lead to higher engagement. The boxplot indicated that while engagement can rise slightly with more hashtags, the effect is uneven and largely driven by increased views rather than meaningful interactions like likes or comments. Since most posts in your dataset already use a high number of hashtags, the marginal value of adding more appears low. This suggests that while hashtags help with visibility, they are not the key differentiator for stronger engagement.

## VI. RESULTS AND DISCUSSION

### 6.1 RESULTS

The caption analysis revealed a clearer and more consistent trend. Posts with **shorter captions** achieved significantly higher average engagement compared to medium or long captions. The histogram and line plot showed that as captions became longer, engagement steadily dropped, with the strongest cluster of engagement occurring in captions under ten words. This suggests that your audience prefers **concise, to-the-point messages** rather than detailed or lengthy text. In other words, brevity improves impact. Long captions not only performed worse on average but also showed more variability, making them less reliable for driving engagement.

The video duration analysis reinforced the importance of **keeping content short and engaging**. The violin plot showed that reels under 10 seconds attracted consistent and relatively high engagement, while those in the 10–20 second range had mixed outcomes, occasionally producing spikes but also dips. Longer videos, particularly those above 20 seconds, tended to underperform, as highlighted by the scatter plot trendline. Specific examples from the data demonstrated this clearly: a short 8-second reel earned strong engagement, while a 24-second reel struggled to perform. This points to a clear pattern where your audience responds better to quick, digestible video content rather than longer reels.

Taken together, the overall data suggests that **simplicity and conciseness** are more effective drivers of engagement for your Instagram audience. Hashtags add some reach but are not decisive, while caption length and video duration show much stronger patterns: shorter captions and shorter reels consistently deliver higher engagement. These insights imply that focusing on **punchy, brief captions and keeping reels concise** will likely yield the best results, with hashtags serving as a supporting element rather than the main strategy.

### 6.2 DISCUSSIONS

#### 1. Content Strategy

- Storytelling-style captions that highlight job struggles and personal experiences proved more engaging than plain informational posts, showing the audience’s preference for relatable narratives.
- Posts that presented real-life scenarios such as interview stress or rejection resonated strongly, encouraging likes, shares, and discussions.
- Humour and meme-driven reels demonstrated higher shareability, suggesting that light-hearted content helps extend reach beyond the follower base.



- Educational bite-sized posts, such as career hacks and quick guides, added immediate value to viewers and increased the likelihood of saves.
- Posts with bilingual captions (Malayalam-English mix) performed well within the regional audience, reflecting the cultural appeal of localized content.

## 2. Hashtag Strategy

- Using the same set of hashtags repeatedly reduced overall effectiveness; rotation of hashtags helped diversify reach and avoided algorithm fatigue.
- Location-specific hashtags like #KeralaJobs, #MalayaliReels, and #SouthIndiaJobs aligned better with the target audience, driving more relevant engagement.
- A combination of broad hashtags (#CareerTips, #JobMotivation) and niche-specific hashtags (#MalayaliCareer, #FreshersKerala) balanced wide exposure with community targeting.
- Branded campaign hashtags such as #TickbigSuccessStories encouraged user-generated content, enhancing credibility and organic promotion.
- Regular hashtag performance analysis allowed underperforming hashtags to be removed, making the strategy more streamlined and effective.

## 3. Posting Frequency

- A posting rhythm of 3–4 posts per week provided consistency without overwhelming the audience, helping each post achieve maximum visibility.
- Engagement was higher during peak hours, particularly evenings and weekends, which highlighted the importance of timing in content release.
- A balanced mix of content formats (reels, carousels, and static posts) ensured variety, keeping the audience engaged across multiple post types.
- Allowing high-performing reels to circulate for longer before posting new content increased their organic reach.
- Experiments with frequency, such as daily vs. spaced posting, offered insights into the optimal schedule for engagement without audience fatigue.

## 4. Improving Likes & Views

- Posts that included clear calls-to-action, such as encouraging users to like or comment, consistently received higher engagement compared to those without CTAs.
- Reels featuring trending audio benefited from greater algorithmic visibility, often reaching wider audiences.
- Strong hooks in the first three seconds of reels improved viewer retention, which was crucial for boosting total reach.
- Carousel posts increased time spent on content, signaling higher quality to Instagram's algorithm and improving overall visibility.

In addition to these, few trends were noticed in the performance of the posts and the behaviour of the viewers.

One of the most important factors that influenced engagement was the **tone of the posts**. Posts that adopted a humorous, light-hearted, or relatable approach tended to gain more traction, while sentimental or



frustration-driven tones occasionally worked depending on the audience's mood. Choosing the right tone for the content therefore played a significant role in connecting with viewers.

**Captions** also played a crucial role in determining the effectiveness of posts. Longer captions often failed to retain attention, whereas short, punchy text encouraged viewers to engage quickly and move to interaction. Brevity proved to be more impactful in sustaining user interest.

The **average watch time of reels** revealed that viewers generally drop off before 10 seconds. This made the opening few seconds of a reel extremely important. Posts that captured attention immediately through striking visuals, hooks, or bold statements performed far better in terms of overall engagement.

In addition to this, **cover images** and the overall **profile bio presentation** influenced how often people chose to engage with posts. Attractive cover images served as entry points to videos, and a well-maintained bio gave visitors a stronger reason to stay and follow. Small details in design and presentation had a noticeable impact on user behaviour.

**Time of posting** emerged as another critical factor. Experiments across different time slots indicated that reels posted at 4 PM, 6 PM, and 9 PM tended to gain higher engagement, whereas posts at 3 PM and 7 PM performed less effectively. This underlined the importance of timing content to match the audience's active hours.

The role of **hashtags** was also significant. Using common, trending hashtags such as *#memes*, *#foryou*, *#explore*, and even actor or movie names increased visibility, but they often attracted a more general audience. While they helped in reaching broader users, they were not always effective in driving meaningful engagement tied to the brand.

**Image-based memes** demonstrated strong potential. For example, one image reel managed to gather more than 9.5k views, which was far higher than average performance levels. This highlighted that meme-driven content, especially when culturally relatable, can outperform traditional formats.

The use of **trending audio** contributed strongly to discoverability. Posts that synced with popular sounds were often promoted by Instagram's algorithm, making them more likely to appear on the explore page and reach non-followers. Staying updated with ongoing trends in audio selection directly impacted reach.

The **visual elements** of a reel, such as font size and color, also played a role. Clear, readable text with strong contrast against the background was more effective, while poor font choices often discouraged users from watching the full content. Subtle design changes proved influential in improving accessibility and appeal.

Finally, the use of **movie clips** was found to be inconsistent. While some clips aligned with audience preferences and performed well, others failed to connect. In comparison, **template-based reels** aligned with current trends showed more reliable performance, as they resonated with popular cultural formats and increased the likelihood of higher engagement.

## VII. CONCLUSION

This research set out to examine the dynamics of user engagement on Instagram through an analysis of scraped data from posts made on the selected account. The focus was placed on three central factors that influence performance: the number of hashtags used, the length of captions, and the duration of videos. In addition, trends in likes and views over time, alongside patterns of most-used hashtags and top-performing posts, were examined in order to gain a holistic picture of audience behavior. The findings provide a multifaceted understanding of how audiences interact with different forms of content and highlight both opportunities and limitations in the existing content strategy.

The analysis of hashtags showed that while they contributed to visibility, their influence on overall engagement was inconsistent. Posts with a high number of hashtags often reached larger audiences in terms of views, but this did not necessarily translate into more likes or comments. The data revealed that hashtags

were more effective in improving surface-level metrics, such as impressions, rather than deeper engagement. This suggests that although hashtags are a useful tool for discoverability, they cannot substitute for compelling content. Overuse of repetitive or irrelevant hashtags may even reduce their effectiveness, a finding that resonates with broader studies on algorithmic behaviour.

Caption length, by contrast, presented a clearer pattern. Posts with shorter captions consistently attracted higher engagement levels, whereas medium and long captions were associated with declining interaction. The trend demonstrates that the target audience favors concise, impactful text rather than extended descriptions. This reflects the consumption habits of digital users, who often scroll quickly and engage more with posts that deliver immediate value. Long captions did not only underperform but also showed higher variability in outcomes, making them less reliable as an engagement driver. Therefore, a focus on brevity and clarity in captions appears to be a more effective communication strategy for this particular audience.

The role of video duration emerged as equally significant. The violin and scatter plots highlighted that shorter reels, especially those under ten seconds, consistently generated higher and more stable engagement. Mid-length videos occasionally produced spikes in performance, but results were less predictable, while longer reels generally underperformed. This pattern underscores the importance of aligning content with contemporary consumption behaviours, where short-form video is increasingly favored by both audiences and algorithms. It also reinforces the importance of delivering strong hooks early in a video, as audience attention is most fragile in the opening seconds.

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