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Analysis the Influence of Topic Types and Posting Days on User Engagement: A Case Study of the XYZ Instagram Account

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Abstract. This study examines how content type and posting day affect user engagement on the XYZ Instagram account. As technology advances, traditional media outlets increasingly rely on social platforms to reach broader audiences. Understanding engagement factors is crucial for effective digital communication strategies. While digital transformation has pushed traditional media toward social platforms, identifying consistent content-market fit remains a challenge. Using a quantitative approach, this research analyzed 190 posts categorized by topic informative, entertainment, political and posting day Monday to Friday using Kruskal-Wallis tests. The research analyzed posts from the XYZ account to identify patterns and significant relationships. Results reveal content type significantly affects only view counts, while posting day impacts only likes. The combination of both factors shows more substantial influence, affecting likes, views, and average watch time. However, since most engagement indicators showed no significant differences across conditions, content type and posting day don't consistently predict user interaction levels. The findings reveal that while individual factors, content type and posting day show limited significance on their own, their interaction effect is statistically significant for likes, views, and average watch time. This suggests that engagement is not driven by content or timing in isolation, but by the strategic synchronization of what is posted and when. While certain combinations of content and timing may boost specific engagement metrics, the research suggests other factors may play more decisive roles in determining overall social media performance and audience connection.

Keywords: Instagram, Content Type, Posting Day, User Engagement, Social Media

1. Introduction

Internet networks have become an integral part of daily life, facilitating connectivity, online business, digital banking services, healthcare, education, and remote communication [1]. Social media has developed rapidly, becoming an essential platform for modern society to interact, seek information, and promote products [2]. Data from 2024 shows there are 5.35 billion internet users worldwide, an increase of 1.8% from the previous year [3], while in North Sulawesi, 74.20% of the population actively uses the internet [4]. Social media offers various benefits including ease of communication, knowledge expansion [5], valuable data on consumer behavior [6], digital marketing opportunities [7], two-way communication with customers [8], and Electronic Word of Mouth (eWOM) that influences purchasing decisions [9]. Instagram in Indonesia has a significant impact on social and economic aspects, becoming an effective platform for product information dissemination [10] with various advantages including free advertising and ease of management [11]. As of February 2024, there were 88,861,000 Instagram users in Indonesia, comprising 54.8% women and 45.2% men [12].

XYZ Post, the largest communication network in North Sulawesi established in 1986, has adapted to digital technology developments by launching and creating several social media accounts to reach a wider audience [13][14]. Understanding the target audience is key to marketing success [15], even with its proven track record, the XYZ Instagram profile shows some inconsistencies in terms of the level of interactions generated. From early observations, it seems that the profile has had difficulty identifying what types of content actually appeal to the local audience, hence making it difficult to achieve predictability when it comes to levels of interactions. While studies have shown that certain trends can be found in social media, it has not been quantitatively proven how content and time of posting influence each other within the context of the local digital environment in Indonesia.

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Based on the observation at XYZ Post, research is needed to determine optimal posting days and content types to increase user engagement [16].

The contributions of this research are embedded in two areas:

1. Content Strategy Improvement: Providing useful information to local media managers to boost visibility and engagement.
2. Social Media Research: Contributing new knowledge to the theory of engagement synergy by showing that interaction variables yield better predictions of success than individual variables.

2. Methodology

2.1 Method Flow

The research flow consists of stages or steps that have been determined in the study, and the research steps are adjusted according to the statistical analysis stages that will be performed. The following is the research flow applied by the researcher in this case study.

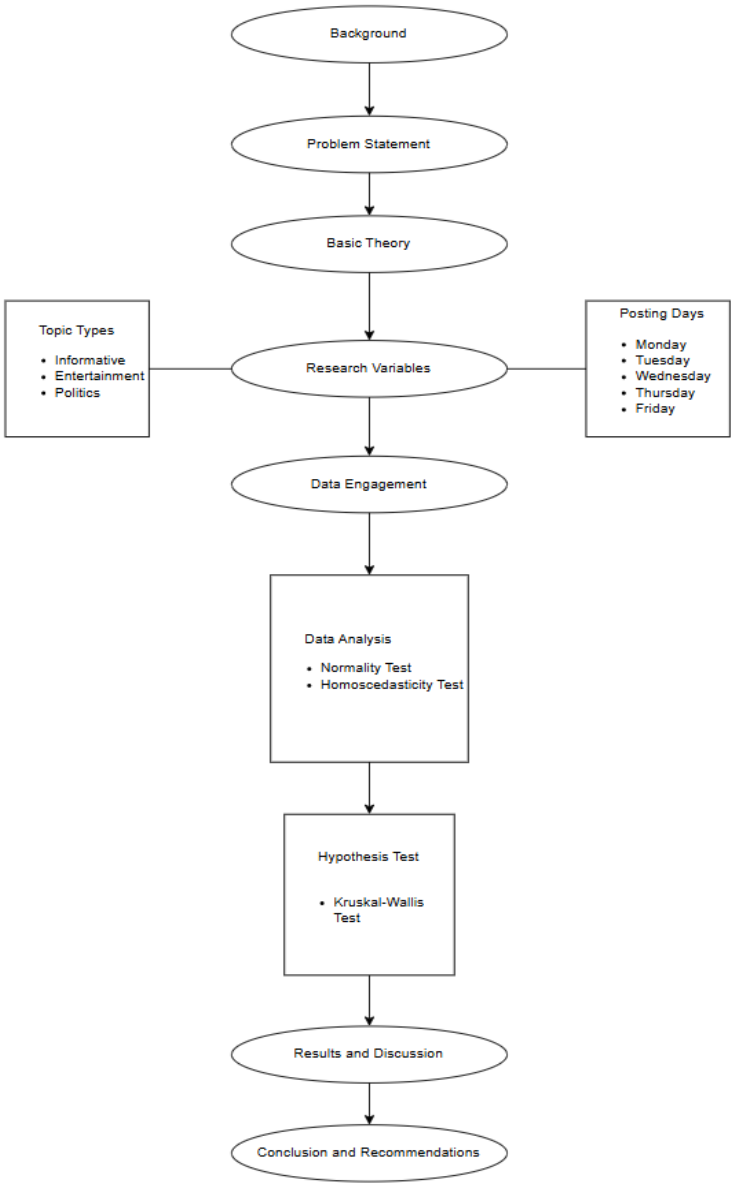

Figure 1. Research Flow

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According to Figure 1, the research flow follows a systematic approach that begins with identifying problems based on the research background, followed by formulating specific research questions. The researcher then conducts literature studies by examining relevant theories and previous research, before determining appropriate variables for measurement. This initial phase establishes the theoretical and methodological foundation for the study of the XYZ Instagram account.
The research then progresses to data collection, focusing on engagement metrics across different content types and posting days. This is followed by rigorous testing and statistical analysis to identify patterns and relationships. After carefully analyzing the statistical results, the process concludes with drawing meaningful conclusions and offering practical content management strategy recommendations specifically tailored for the XYZ Instagram account to optimize its performance and user engagement.

2.2 Population and Sample

This study used a population consisting of 352 posts from the Instagram account XYZ during the researcher's internship period. These posts were categorized based on content type (informative, political, entertainment) and posting day (Monday, Tuesday, Wednesday, Thursday, Friday). To obtain a representative sample, the researcher applied a stratified sampling technique followed by simple random sampling.

The sample size was determined using Slovin's formula with a precision level of 5%, resulting in an initial sample size of 188 posts. However, after applying proportional allocation within each stratum, the total sample size increased to 190 posts. Therefore, the final sample used in this study consisted of 190 posts, proportionally distributed across content types and posting days, and selected randomly from each stratum. The increase from 188 to 190 samples is statistically justified through the application of proportional allocation within the stratified sampling method. For the informative and entertainment strata, the calculation (124/352×188) resulted in 66.25, which was rounded up to 67. For politic, the calculation (104/352×188) resulted in 55.54, rounded up to 56. The final total of 190 posts (67+67+56) is the result of these necessary round-ups to maintain the integrity of the strata.

2.3 Data Collection Method

According to [17], using the correct data collection techniques is essential, as appropriate methods contribute to effective research planning. To obtain the necessary data for this study, the researcher used a documentation method, collecting Instagram insights from each video content in the sample on the XYZ Instagram account. Additionally, upload dates were recorded manually from each video post.

2.4 Data Analysis Method

According After collecting the sample or other information sources, data analysis was conducted using a quantitative approach [18]. This study applied descriptive statistics to provide an overview of the variables used, including topic type, posting day, and user engagement. The collected data were analyzed by describing or summarizing them as they were, without drawing generalizable conclusions [19]. The measurements included mean, standard deviation, minimum, and maximum values [20]. For data analysis, Python was utilized to generate statistical results. Normality assumption is determined by data that are symmetrically distributed and follow or approximate a normal distribution. Therefore, the researcher conducted a normality test using the Kolmogorov-Smirnov test, if the significance value > 0.05, the data are considered normally distributed [21]. The purpose of the homoscedasticity test is to determine whether the sampled data has homogeneous or heterogeneous distribution. Homoscedasticity occurs when the variance of residuals remains constant across observations; otherwise, it is called heteroscedasticity. In this study, the Levene's test was used to assess data homogeneity. The decision was based on the significance value; if it was greater than 0.05, homogeneity was assumed, if less than 0.05, heterogeneity was indicated [22]. The Kruskal-Wallis test is a non-parametric statistical method used for data that are not normally distributed or measured on an

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ordinal scale [23]. It is conducted to determine if there are significant differences between the medians of three or more independent groups. This test serves as an alternative to one-way ANOVA and works by analyzing ranked data rather than original values [24]. In general, the statistical pipelines are:

1. Assessment of Normality: The Kolmogorov-Smirnov test revealed that most of the variables (likes, comments, views) had a p-value less than 0.05, suggesting that they were not normally distributed.
2. Assessment of Homogeneity: Levene's test was applied to assess variance homogeneity. While the initial dataset was found to be heteroscedastic, the sample used to test the hypothesis showed that the data distribution was suitable for a non-parametric test.
3. Kruskal-Wallis Test: With the normality assumption being rejected, the Kruskal-Wallis test was the optimal tool to use. As a non-parametric equivalent of one-way ANOVA, it allows comparing medians of different groups through rank analysis.

3. Result And Discussion

Below are the results of the analysis based on Instagram Reels data from the XYZ account, categorized into three content types Informative, Entertainment, and Political which were then examined by posting day to assess their effect on user engagement. The analysis focuses on four engagement indicators: likes, comments, views, and average watch time.

3.1 Research Object Overview

Launched in March 2024, XYZ is a digital news portal and utilizing Instagram Reels as its primary content platform. The account is designed to deliver news in video format, targeting the digital audience with visually engaging short-form content.

The content featured on XYZ revolves around three main topics:

1. Informative Content: Videos that present news enriched with relevant data and educational information. These aim to inform the public, enhance their understanding of various issues, and support better decision-making and public trust.
2. Entertainment Content: Videos that offer entertainment through celebratory events, public opinions on trending social topics, and updates from the entertainment world. These are intended to emotionally engage and amuse the audience.
3. Political Content: Videos that address issues related to public policy, government affairs, political parties, ideologies, and social policies. These often involve commentary or coverage of political debates and events.

This variety allows XYZ to cater to diverse audience interests and engagement behaviors. The following sections present the statistical results and analysis of how these content types, and their posting schedules affect user engagement.

3.2 Normality and Homoscedasticity Tests

Prior to hypothesis testing, assumption testing was conducted to determine the suitability of the data for statistical analysis. The normality test using the Kolmogorov–Smirnov method showed that most variables, including likes, comments, and views, had significance values below 0.05, indicating that the data were not normally distributed. Only the variable average watch time approached normal distribution with p-values above 0.05. In addition, a Levene's test for homoscedasticity was performed to evaluate the equality of variance across groups. The results indicated that the residuals of the variables had unequal variance ($p < 0.05$), confirming heteroscedasticity in the dataset.

Given these findings, the use of non-parametric tests, particularly the Kruskal–Wallis test, was deemed appropriate for hypothesis testing in this study.

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3.3 Content Type and User Engagement

Based on the Kruskal-Wallis test on table 1, content type had a significant influence only on the number of views ($p < 0.05$). This indicates that certain content types are more likely to be watched than others. However, there was no significant influence of content type on likes, comments, or average watch time ($p > 0.05$). Therefore, it is concluded that content type alone does not significantly affect overall user engagement, leading to the rejection of Hypothesis 1.

Table 1. Kruskal-Wallis Test of Content Type on User Engagement

Dependent Variable	H-Statistic	p-Value	Conclusion
Like	3.87	0.14	Insignificant
Comment	1.37	0.50	Insignificant
Views	24.95	0.00	Significant
Average_Watch_Time	0.55	0.76	Insignificant

3.4 Content Type and User Engagement

The Kruskal-Wallis test on table 2 for posting day revealed a significant effect only on the number of likes ($p = 0.02$), suggesting that certain days may encourage more user reactions in the form of likes. However, no significant influence was observed on comments, views, or average watch time. Hence, the conclusion is that posting day does not consistently affect user engagement, and Hypothesis 2 is rejected.

Table 2. Kruskal-Wallis Test of Posting Day on User Engagement

Dependent Variable	H-Statistic	p-Value	Conclusion
Like	12.24	0.02	Significant
Comment	7.89	0.10	Insignificant
Views	8.65	0.07	Insignificant
Average_Watch_Time	5.11	0.28	Insignificant

3.5 Interaction of Content Type and Posting Day

Further analysis was conducted to examine the combined effect of content type and posting day. The Kruskal-Wallis test on table 3 showed a significant interaction effect on three engagement indicators: likes ($p = 0.01$), views ($p = 0.00$), and average watch time ($p = 0.01$). This demonstrates that synchronizing the type of content with the appropriate day of posting is more effective in enhancing user engagement than considering each factor in isolation. As a result, Hypothesis 3 is accepted.

Table 3. Kruskal-Wallis Test of combining effect

Dependent Variable	H-Statistic	p-Value	Conclusion
Like	28.03	0.01	Significant
Comment	15.92	0.32	Insignificant
Views	40.80	0.00	Significant
Average_Watch_Time	28.49	0.01	Significant

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4. Conclusion

This study aimed to analyze the influence of content type and posting day on user engagement on the XYZ Instagram account. Engagement indicators included the number of likes, comments, views, and average watch time. Based on the findings derived from the Kruskal-Wallis test, the following conclusions can be drawn:

1. Content type significantly influenced the number of views only. This indicates that the type of content published can attract user attention to watch the video, but it does not significantly impact deeper engagement actions such as liking, commenting, or prolonged viewing. This suggests that content selection plays a role in visibility, but not necessarily in generating interaction or sustained attention.
2. Posting day had a significant effect only on the number of likes. This suggests that the day on which content is published can potentially boost likes but does not significantly influence comments, views, or average watch time. Therefore, choosing the right day may help generate initial engagement but is insufficient alone to drive broader involvement.
3. When testing the interaction between content type and posting day, a significant effect was observed on three out of four engagement indicators likes, views, and average watch time. This finding implies that content strategies which simultaneously consider both content type and timing can more effectively enhance engagement on the XYZ platform. The synergy between what is posted and when it is posted appears to be key in maximizing content performance.
4. Although some significant effects were observed, most engagement indicators did not show consistent differences in the separate tests. Thus, it can be concluded that the influence of content type and posting day on user engagement is not yet consistently strong across all forms of engagement. A more holistic approach, possibly involving other content elements or user-specific factors, may be needed to achieve consistently high engagement.

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