



Social Media Platform Preference and Perceived Online Community

Complete Report

In Partial Fulfillment

Of the Subject

Math 222 Applied Statistics

Section 1

Submitted to:

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1. Introduction

1.1 Purpose

The purpose of this study is to understand peoples' primary social media platform and their sense of community. A person's primary social media platform is important as it takes up the most of the user's time and their attention. It is crucial to know how much of a sense of belonging people feel from those platforms.

1.2 Problem Statement

While social media platforms build connections, we should still understand how much of those connections are actually built. One platform may make one feel alone while another may make one feel connected. This study investigates whether users from different platforms perceive the same sense of community as users from another platform. This study also addresses a gap in understanding digital social dynamics.

2. Objective

2.1 Overall Objective

The objective of this study is to compare the sense of community between different social media platforms as not all platforms are able to provide the same sense of community.

2.2 Specific Objective

Compare the sense of community between different social media platforms by conducting a descriptive statistics analysis by finding the average (mean, median, standard deviation) between all platforms and graphing them (tables, charts, histograms) and conducting an inferential statistics analysis using an independent samples t-test to compare the mean perceived online community scores between users of two chosen primary platforms (e.g., Facebook vs. TikTok).

3. Study Design

3.1 Research Questions

This research aims to answer key questions such as:

1. What is the most used social media platform amongst participants?
2. What is the average perceived sense of community for each platform?
3. Is there a difference in the perceived sense of community between each platform?
4. Are there any trends in the most used platforms by participants based on age or gender?

3.2 Target Population

The target population for this research includes social media users from all age groups and genders. Primarily focused on young adults, as they represent the majority of online users.

3.3 Population Parameter

The population parameter for this research is the mean of the perceived sense of community on each social media platform.

3.4 Sampling Methods and Procedures

This research uses a non-probability sampling method, specifically convenience sampling.

3.5 Sample Size

This research requires a minimum sample size of 200 participants.

3.6 Method of Data Collection

Data is collected through an online survey (Google Form) which includes the following questions:

1. How old are you?
2. What is your gender?
3. Which social media platform do you use the most?
4. How much of a sense of community do you feel on your most-used social media platform? (standardized linear scale from 1-10)

Data is mostly collected through personal networks (family, friends, classmates and colleagues) and some from social media.

3.7 Method of Data Analysis and Presentation:

- **Descriptive Analysis:** Summarize the primary social media platform and perceived online community scores. Compute the mean, median, and standard deviation for the perceived online community for each platform. Compare the perceived community scores across the different platforms.
- **Inferential Analysis:** Conduct two independent samples t-test to compare the mean perceived online community scores between users of two chosen primary platforms (e.g., Facebook vs. TikTok).

- **Data Presentation:** Data will be visualized through tables, charts and graphs.

4. Review of Related Literature

4.1 Purpose

This section summarizes prior research, theories, and models related to social media platform preferences and the perceived sense of online community. The goal is to provide a theoretical and empirical background that informs the current study, which investigates whether users of different platforms experience different levels of online community. Understanding how previous studies have approached these concepts helps establish a foundation and identify the gap that this study aims to fill.

4.2 Summary

Perceived online communities are based on traditional community theories, such as McMillan and Chavis' (1986) Sense of Community theory. This theory has four components: membership, influence, integration and fulfillment of needs, and shared emotional connection. These elements help determine how connected users feel on platforms such as Facebook, TikTok, Instagram, and Twitter/X.

According to research, the design and purpose of a platform influence community perception. For example, Facebook is commonly associated with maintaining existing relationships and community building (Hampton et al., 2011), whereas TikTok is known for entertainment and content consumption (Kaye et al., 2022). This may lead to users perceiving a stronger community on Facebook than on TikTok, a hypothesis that this study seeks to test.

Platform preferences are frequently influenced by demographics such as age, gender, and digital literacy. According to Auxier and Anderson (2021), younger users prefer visual-heavy platforms such as TikTok and Instagram, whereas older users spend more time on Facebook. These preferences may influence how people interact with others, and thus how much of a sense of community they feel.

Gruzd and Haythornthwaite (2013) found that interest-based groups and interaction frequency were significant predictors of perceived online community strength. Their findings support the notion that platforms that allow for more two-way interaction and shared experiences foster stronger communities.

While these studies provide valuable insights, the majority of them focus on specific platforms or general online behavior. Few use statistical methods like t-tests to directly compare users' perceptions of online communities across multiple platforms. This study fills that gap by conducting both descriptive and inferential analyses to see if platform preference influences perceived online community levels.

5. Work Plan

Tasks	Criteria	Plan of work
Topic selection	Choose Topic	26 or 28 May 2025
Member Task assignment	Responsibility Assignment	02 June 2025
Design Questionnaire	Create and finalize the survey form for data collection	06 June 2025
Data Collection	Distribute the questionnaire and collect at least 200 responses	06 June 2025 - 15 June 2025
Project Proposal	Project Proposal	13 June 2025
Descriptive Statistics	<ul style="list-style-type: none"> - Collect sample data - Summary statistics: percentage, mean, mode, median, standard deviation - Graph: Dot-plot, Pie-chart, Box-and-whisker plots, Histogram, etc. and explanation. 	15 June 2025
Inferential Statistics	<ul style="list-style-type: none"> - Clarify Null and alternative hypothesis, if required - Assuming 95% confident level, calculate test statistics - Draw the conclusion on the test statistics 	18 June 2025
Complete Report Submission	Submit complete report as per the format containing the proposal, the descriptive statistics and the inferential statistics annexed with raw data	20 June 2025
Presentation	Prepare Presentation Slides and Present during class hours.	23 or 25 June 2025

6. Descriptive Statistics

6.1 Gender and age demographics (Raw Data)

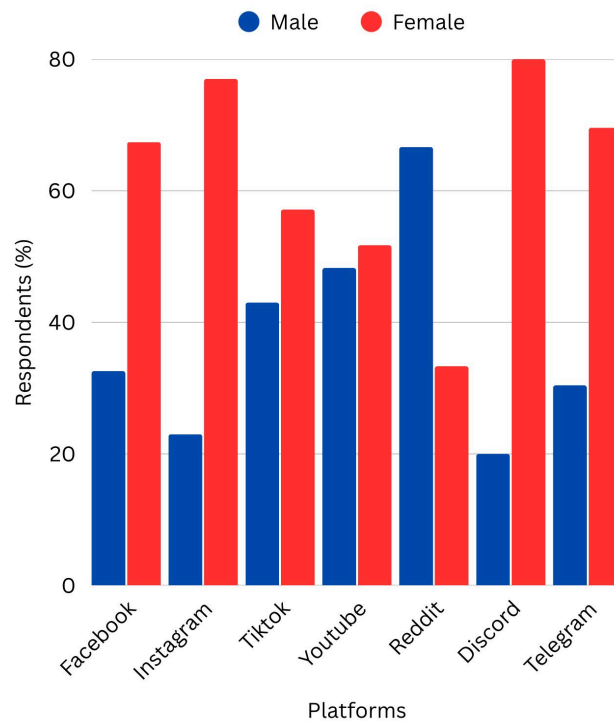


Figure 1: Gender Distribution by Platform

Our respondents consist mostly of women, 64% women and 36% men.

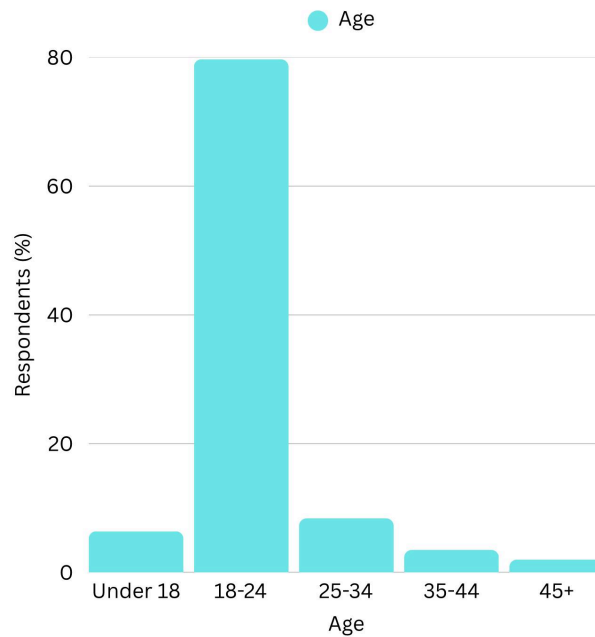


Figure 2: Age Distribution

Our survey consists mostly of young adults aged 18-24, as they represent the majority of online users.

Social media platforms picked

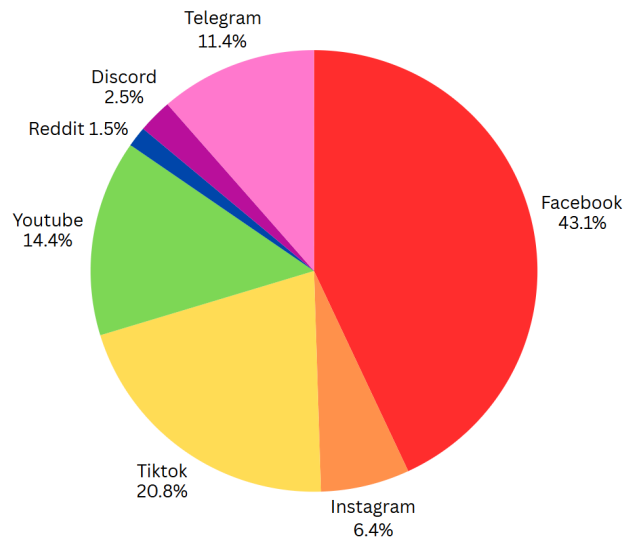


Figure 3: Social Media Platforms Distribution

In our survey, we found that Facebook is the most used social media platform by respondents at 43.1%, with TikTok coming up second at 20.8%. Reddit is the least picked platform, with only 1.5% of respondents.

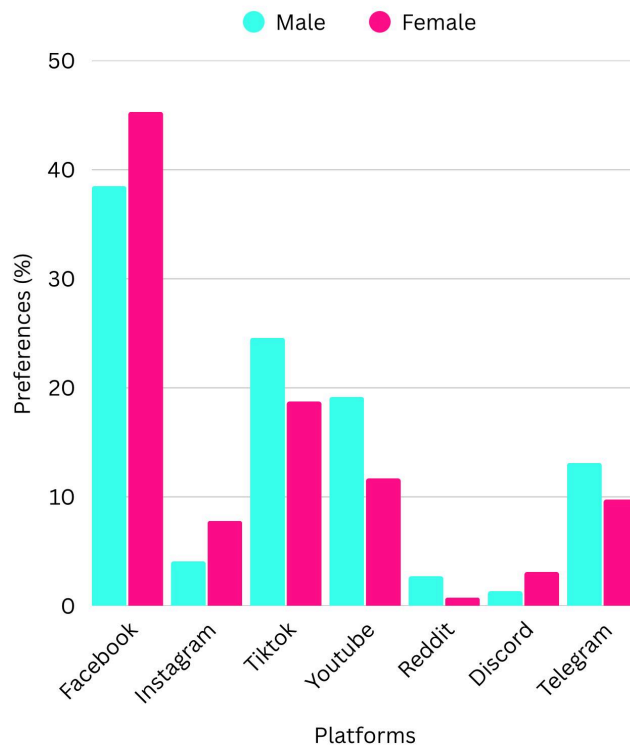


Figure 4: Platform Preferences Within Genders

Even though respondents' genders from our survey were unequal, we are still able to define the preference for each platform by computing the percentages.

The result shows that women typically prefer Facebook, Instagram and Discord more than men, while men prefer TikTok, YouTube, Reddit and Telegram more.

6.2 Sense of community

Score	Facebook	Instagram	TikTok	Youtube	Reddit	Discord	Telegram
1	6	0	1	1	0	1	1
2	5	0	0	2	0	0	2
3	5	2	1	2	0	0	1
4	3	1	0	3	0	0	0
5	20	0	9	3	0	0	1
6	13	6	3	1	0	0	2
7	16	3	8	6	2	0	4
8	9	1	12	8	1	2	8
9	4	0	5	1	0	1	2
10	6	1	3	2	0	1	2

These are the scores of sense of community across various platforms on the scale of 1-10. Higher scores indicate stronger community perceptions.

6.3 Mean, Median and Mode

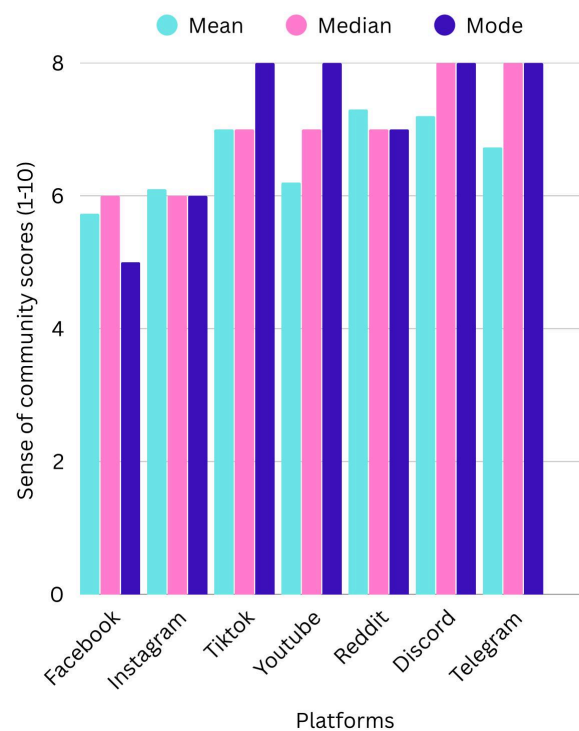


Figure 5: Average Sense Of Community Scores

This chart represents the average scores of “sense of community” across various platforms based on our survey. The result shows that Reddit has the highest mean, indicating that Reddit fostered the highest sense of community amongst participants.

6.4 Standard deviation

In our study, we will be comparing two of the primary social media platforms from our survey, TikTok and Facebook

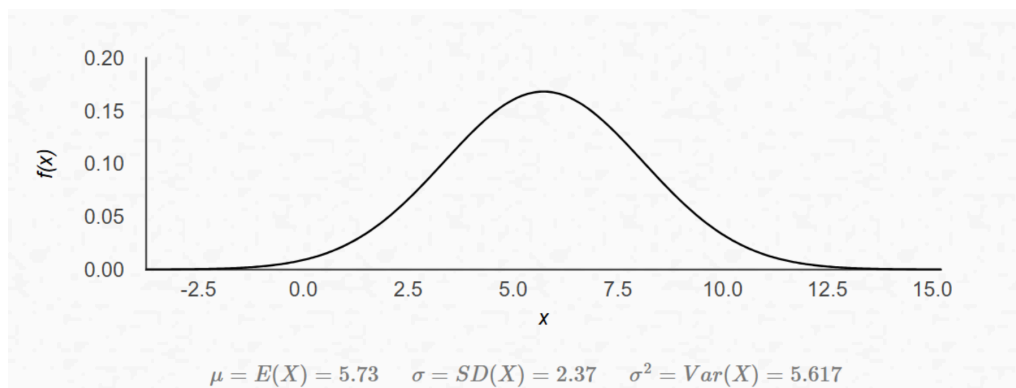


Figure 6: Standard deviation of Facebook sense of community scores

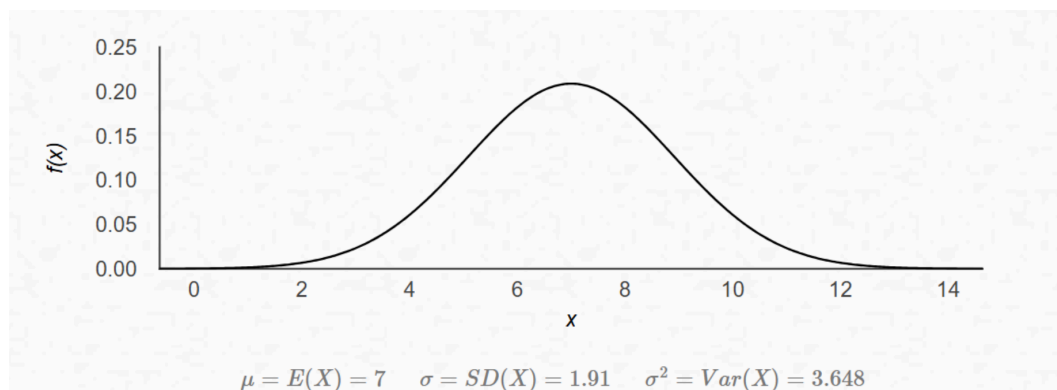


Figure 7: Standard deviation of TikTok sense of community scores

Based on our survey, Facebook has a standard deviation of 2.37 while TikTok has a standard deviation of 1.91. This indicates that participants' opinions about TikTok's sense of community were more consistent, whereas responses for Facebook were more varied.

7. Inferential Statistics

Objective: To determine whether there is a statistically significant difference in the **mean perceived online community scores** (measured on a 1–10 scale) between **Facebook** and **TikTok** users, using an independent two-sample t-test with the assumption of **unequal variances** (Welch's t-test).

7.1 Data Summary

From our survey results of 202 samples:

Score	1	2	3	4	5	6	7	8	9	10
Facebook	6	5	5	3	20	13	16	9	4	6
TikTok	1	0	1	0	9	3	8	12	5	3

We can summarize the samples as:

	Sample Size	Sample Mean	Sample Standard Deviation
Facebook	$87(n_1)$	$5.76(\bar{x}_1)$	$2.38(s_1)$
TikTok	$42(n_2)$	$7(\bar{x}_2)$	$1.91(s_2)$

7.2 Hypothesis Testing

1. State Hypothesis

$$H_0: \mu_1 = \mu_2$$

$$H_1: \mu_1 \neq \mu_2 \text{ (claim)}$$

Where μ_1 and μ_2 are the population mean perceived online community scores of Facebook and TikTok, *respectively*.

2. Test Statistic Value

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} = \frac{(5.76 - 7) - 0}{\sqrt{\frac{2.38^2}{87} + \frac{1.91^2}{42}}} = -3.18$$

3. P-Value

$$d.f. = \frac{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)^2}{\frac{1}{n_1-1}\left(\frac{s_1^2}{n_1}\right)^2 + \frac{1}{n_2-1}\left(\frac{s_2^2}{n_2}\right)^2} = \frac{\left(\frac{2.38^2}{87} + \frac{1.91^2}{42}\right)^2}{\frac{1}{86}\left(\frac{2.38^2}{87}\right)^2 + \left(\frac{1.91^2}{42}\right)^2} \approx 99$$

Since this is a two-tailed test with **d.f. = 99**, we compare the t-statistic **-3.18** to the t-distribution table t-table:

The critical value for $\alpha/2 = 0.005$ (left tail) is **-2.6264** Since **-3.18 < -2.6264**, the p-value is:

$$p - value < 2 \times 0.005$$

$$\Rightarrow p - value < 0.01$$

We can Data Analysis tool in Excel to solve this hypothesis test and find exact p-value

t-Test: Two-Sample Assuming Unequal Variances		
	<i>Facebook</i>	<i>Tik Tok</i>
Mean	5.758621	7
Variance	5.650361	3.658537
Observations	87	42
Hypothesized Mean Difference	0	
df	99	
t Stat	-3.1835	
P(T<=t) one-tail	0.000973	
t Critical one-tail	2.364606	
P(T<=t) two-tail	0.001945	
t Critical two-tail	2.626405	

Therefore **P-Value = 0.001945**

4. Decision Making

Since this is a two-tailed test with **d.f. = 99**, our calculated t-value of **-3.18** gives an extremely small p-value (0.001945). While no specific α level was pre-defined, this result would be statistically significant even at the very conservative $\alpha = 0.01$ threshold - the highest standard commonly used for declaring significance. Therefore, we have exceptionally strong evidence to reject the null hypothesis **H₀**.

5. The 99% Confidence Interval

$$\begin{aligned}(\bar{x}_1 - \bar{x}_2) - t_{\alpha/2} \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} &< \mu_1 - \mu_2 < (\bar{x}_1 - \bar{x}_2) + \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} \\(5.76 - 7) - 2.63 \sqrt{\frac{2.38^2}{87} + \frac{1.91^2}{42}} &< \mu_1 - \mu_2 < (5.76 - 7) + 2.63 \sqrt{\frac{2.38^2}{87} + \frac{1.91^2}{42}} \\-1.26 - 1.025 &< \mu_1 - \mu_2 < -1.26 - 1.025 \\-2.285 &< \mu_1 - \mu_2 < -0.175\end{aligned}$$

Since the confidence interval does not contain zero, the decision is still to reject the null hypothesis **H₀** at $\alpha = 0.01$. The difference between μ_1 and μ_2 being negative means the population mean perceived online community scores of Facebook is less than that of TikTok. With $\alpha = 0.01$ we have enough evidence to support the alternative hypothesis that there is a difference between the population mean perceived online community scores of Facebook and TikTok. Based on the 99 % of confidence interval, we can conclude as the population mean perceived online community scores of **Facebook is less than** the population mean perceived online community scores of **TikTok**.

8. Conclusion

By looking at our survey results, we found that most respondents were women (64%) and between the ages of 18 and 24. Facebook was the most commonly used platform (43.1%), followed by TikTok (20.8%). Reddit had the fewest users (1.5%). Preferences for platforms varied by gender. Women tended to prefer Facebook, Instagram, and Discord, while men leaned toward TikTok, YouTube, Reddit, and Telegram.

The analysis also showed that Reddit had the highest sense of community, even though it had the least users. TikTok had more consistent community scores ($SD = 1.91$) compared to Facebook ($SD = 2.37$), indicating more agreement among users. This suggests that the number of users doesn't always mirror the strength of the community.

To determine whether there is a significant difference between Facebook and TikTok users' mean perceived online community scores, we then conducted an inferential statistical analysis using an independent two-sample t-test (Welch's t-test). Based on our sample, this test assists us in drawing conclusions about the broader population. The findings revealed a p-value of 0.001945 and a t-statistic of -3.18. We reject the null hypothesis because the p-value is less than the significance level of 0.01. Zero is not included in the 99% confidence interval for the mean difference. This provides more proof of a noteworthy distinction. We can conclude that the population mean perceived online community scores of **Facebook is less than** the population mean perceived online community scores of **TikTok**.

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