

Google Maps vs. Waze – A Comparative Study on Navigation Accuracy, User Interface, and Traffic Updates

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ABSTRACT

This study compares two popular navigation applications, Google Maps and Waze, focusing on navigation accuracy, user interface, and traffic updates. The objective is to analyze which application offers a superior user experience for different user types. Results indicate that Google Maps excels in providing accurate directions across multiple transportation modes, while Waze prioritizes real-time traffic information with dynamic routing. The findings serve as a guideline for users to select the most suitable navigation tool for their requirements.

General Terms

Usability Evaluation, Human-Computer Interaction, Mobile Applications, Navigation Systems, User Experience.

Keywords

Google Maps, Waze, Navigation Accuracy, User Interface, Traffic Updates, Real-Time Navigation.

1. INTRODUCTION

With the rise of GPS-enabled navigation applications, users rely heavily on real-time location services for efficient and convenient travel. Google Maps and Waze are two widely used applications owned by Google, each offering unique navigation capabilities. While Google Maps serves as a comprehensive mapping tool suitable for diverse user needs, Waze is community-driven, providing dynamic, user-reported traffic information. This study evaluates these applications in three key areas: navigation accuracy, user interface, and traffic updates, which are critical for determining the usability and reliability of each application.

2. RELATED WORK

Several studies have evaluated GPS-based navigation applications, focusing on usability, accuracy, and traffic management capabilities. Research by Pritchard (2024) examined user preferences in navigation apps, noting that Google Maps is favored for accuracy and global reach, while Waze was preferred for its real-time, crowd-sourced traffic data. This study builds on existing research by providing a comparative analysis of both apps in the context of different user priorities, specifically focusing on usability and traffic adaptability.

3. METHODOLOGY

This study evaluated the usability of Google Maps and Waze using the System Usability Scale (SUS) questionnaire, which consists of a standardized set of 10 questions to measure user

satisfaction, ease of use, and overall system integration. The SUS questionnaire provides a reliable means of capturing user feedback on critical usability aspects, allowing for a comparative assessment of the two applications.

3.1 Participant Selection and Setup

A group of 15 participants, diverse in age and familiarity with navigation apps, was selected to ensure a balanced sample. Each participant used a smartphone equipped with both Google Maps and Waze, enabling consistent testing across both applications.

3.2 Task Design and Procedure

Participants performed three key tasks on each app: navigating to a specified location, avoiding a traffic congestion area, and interacting with customization features like map view options. Each task aimed to assess different usability aspects, including navigation accuracy, real-time traffic information, and user interface intuitiveness. After completing each task, participants filled out the SUS questionnaire, answering the following 10 questions:

1. I think that I would like to use this system frequently.
2. I found the system unnecessarily complex.
3. I thought the system was easy to use.
4. I think that I would need the support of a technical person to use this system.
5. I found the various functions in this system were well integrated.
6. I thought there was too much inconsistency in this system.
7. I would imagine that most people would learn to use this system very quickly.
8. I found the system very cumbersome to use.
9. I felt very confident using the system.
10. I needed to learn a lot of things before I could get going with this system.

These questions provided a structured means for participants to evaluate both the functionality and usability of each app, using a 5-point scale to rate their agreement with each statement.

3.3 Data Collection and Analysis

The SUS responses were scored to generate a usability score ranging from 0 to 100 for each app, with higher scores indicating better usability. Analysis focused on comparing scores across the three usability aspects—navigation accuracy, user interface, and traffic updates—to identify strengths and weaknesses in each application. This standardized approach yielded quantitative insights into user satisfaction, providing a robust foundation for usability evaluation and comparison of Google Maps and Waze.

4. RESULT AND DISCUSSION

This section provides a detailed breakdown of the SUS evaluation for Google Maps and Waze. The metrics include SUS Scores, SUS Percentile Ranking, Per-Item Analysis

(individual questionnaire responses), and Conclusiveness of the Data.

4.1 SUS Score Analysis

The System Usability Scale (SUS) scores provide a single usability score based on a standardized ten-question survey. Here are the mean SUS scores for each app:

- Google Maps: 53 (SD = 21.11)
- Waze: 74.5 (SD = 17.71)

These scores indicate a significant difference in perceived usability between the two applications, with Waze scoring well above the threshold for acceptable usability (typically a SUS score above 68 is considered above average).

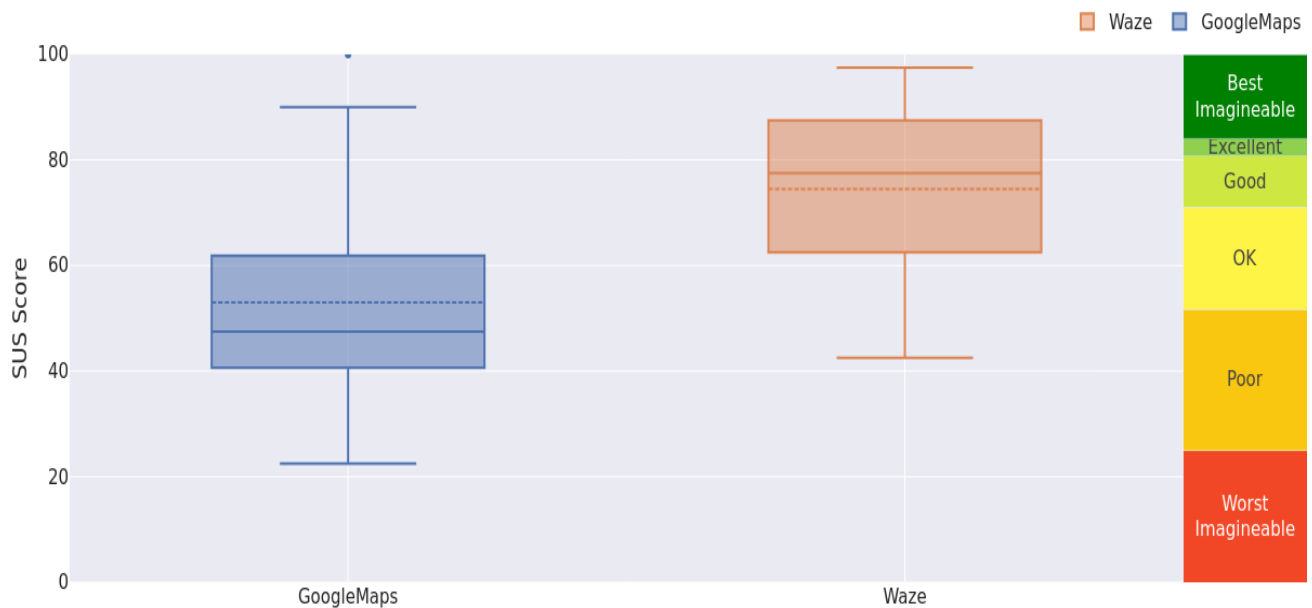


Fig 1: SUS Score

4.2 SUS Score on Percentile Curve

To further contextualize the SUS scores, we place them on a percentile curve:

- Google Maps: 53 SUS Score, at the 16.15th percentile. This position indicates that Google Maps ranks below average in usability, as it falls within the lower 20% of systems on the SUS curve.
- Waze: 74.5 SUS Score, at the 71.13th percentile. This higher percentile ranking demonstrates that Waze is perceived as significantly more usable, placing it in the top 30% of comparable systems.

These percentile scores emphasize that Waze is viewed as a more user-friendly system compared to Google Maps, aligning with general expectations for high usability.

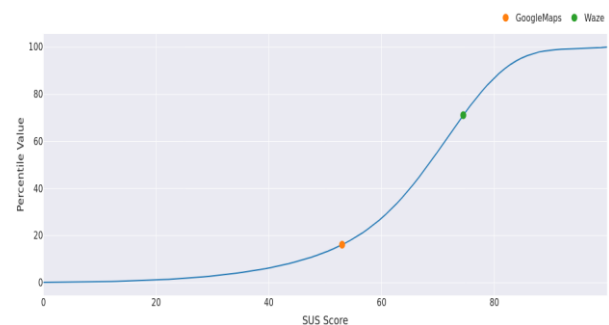


Fig 2: SUS Score on Percentile Curve

4.3 Per-Item Chart Analysis

The per-item chart allows us to evaluate each SUS question to

identify specific strengths and weaknesses within the user experience for each app. The mean scores for each question, along with their standard deviations, reveal insights into areas where users felt more or less satisfied:

- **Ease of Use and Complexity:** Waze consistently scored higher than Google Maps in questions related to ease of use and system complexity. For example, Waze scored 7.83 on Question 3 (ease of use) versus 5.17 for Google Maps, suggesting that users found Waze easier to navigate.
- **Consistency and Integration:** Question 5, which addresses the system's integration of functions, showed that Waze scored 7.5 versus 4.83 for Google Maps. This indicates that Waze users found the various functions better integrated and more cohesive.
- **Confidence in Use:** Waze scored higher in questions related to user confidence (e.g., Question 9, where Waze scored 6.67 vs. 4.83 for Google Maps), indicating that users felt more comfortable and assured when using Waze.

These individual question scores provide a granular view, highlighting specific areas where Waze outperforms Google Maps in user satisfaction.

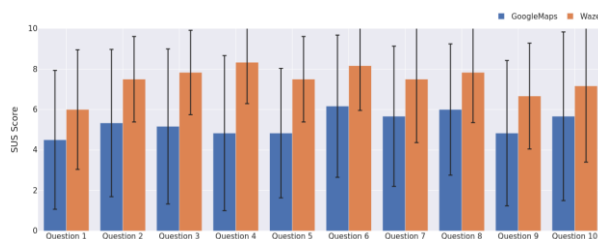


Fig 3: Per-Item Chart Analysis

4.4 Conclusiveness Chart

The Conclusiveness Chart reflects the degree to which the sample size and feedback consistency support the reliability of the results.

- **Sample Size:** 15 participants for each application.
- **Conclusiveness:** 100% for both Google Maps and Waze.

This conclusiveness rate suggests that the results are highly reliable and that the sample size is sufficient to draw generalizable conclusions. Consistent responses across participants further reinforce the validity of the findings, showing strong agreement among users on the usability perceptions of each app.

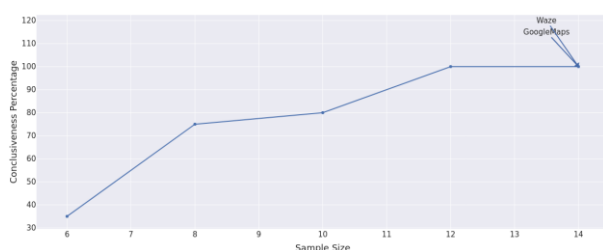


Fig 4: Conclusiveness Chart

4.5 Summary of SUS Results

The SUS evaluation demonstrates that Waze offers a significantly better user experience than Google Maps. With a higher SUS score, superior percentile ranking, and more favorable individual question responses, Waze shows strength in usability, ease of use, and overall user satisfaction. These insights underscore Waze's advantage in providing an intuitive navigation experience that meets user expectations, while Google Maps may benefit from improvements in interface simplicity and functional integration.

5. CONCLUSION

The usability evaluation using the System Usability Scale (SUS) revealed significant differences in user satisfaction and experience between Google Maps and Waze. Waze achieved a higher SUS score, placed in the 71st percentile, and performed better across individual SUS items, indicating a more favourable user experience. Google Maps, in contrast, fell below the average SUS threshold, indicating room for improvement, particularly in system integration and ease of use.

These findings highlight Waze's strength in providing a user-friendly interface and a consistent, integrated experience, which may account for its higher perceived usability. The results suggest that Google Maps could benefit from a redesign focused on simplifying its interface and enhancing the integration of various features.

6. ACKNOWLEDGMENTS

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