

# Analyzing the Shift in User Search Preference from Traditional Search Engines to Large Language Model (LLM)-Based AI Chatbots: A Survey-Based Study

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## Abstract

With the rapid rise of Large Language Model (LLM)-based AI chat-bots, user behavior in information seeking is undergoing a noticeable shift. This study investigates the preference change from traditional search engines, such as Google, to AI-driven platforms. A survey was conducted with 50 participants, collecting data on demographics, education level, awareness of AI, first search choice, screen time, and prior experience with AI tools. The results indicate that a significant majority of users, particularly those who are college-enrolled or have prior exposure to AI, prefer LLM-based chat bots as their primary traditional search tool over Google. Factors influencing this shift include perceived ease of use, efficiency, and the ability of AI chat bots to provide direct, clear, and personalized answers. While Google remains relevant for certain types of searches, the findings demonstrate a measurable trend toward adopting AI chat bots as the first preference for information retrieval. This study provides insights into evolving user search behavior and highlights the growing impact of conversational AI in shaping future search habits.

**Keywords:** Large Language Models (LLMs), AI Chatbots, Chat GPT, Google, User Search Preference, Survey Study

# 1 Introduction

A few years back, traditional search engines like Google [1] were the primary tools people used to find information online. Users relied on search results pages, links, and summaries to gather knowledge, complete tasks, and learn new things. However, with the rise of AI chatbots [2] based on large language models (LLM), such as ChatGPT, Claude, and DeepSeek, the way people search for information is beginning to change. These AI chatbots provide direct, clear, and conversational answers, often reducing the need to browse multiple websites. This shift is particularly noticeable among younger users and students who are more familiar with AI tools [3] and comfortable using technology. Understanding why users are moving from Google to LLM-based chatbots can help researchers and developers improve search experiences and better support digital learning.

## 1.1 Traditional Search Engines

Google Search has been the dominant search engine worldwide for over two decades. It indexes billions of web pages and uses advanced algorithms to provide relevant results for user queries within seconds. It has been the most widely [4] used search engine for years. It provides access to an enormous database of [5] websites, images, news, and maps. Users trust Google for reliable information and official sources. However, searching on Google often requires navigating multiple web pages and synthesizing information, which can be time-consuming [6] for tasks like coding, writing, or learning new concepts.

## 1.2 Large Language Model (LLM)–Based AI Chatbots

Large Language Models (LLMs) are advanced Artificial Intelligence (AI) [7] systems designed to process, understand, and generate human-like language based on vast amounts of textual data. These models, such as ChatGPT, Claude, and DeepSeek, use deep learning techniques [8] and transformer architectures to provide intelligent, context-aware responses. Unlike traditional search engines, which list web pages in response to a keyword query, LLMs can generate direct, conversational answers, summarize information, and even assist in creative or technical tasks.

# 2 Literature Reviews

Over the past few years, several studies have explored user search behavior, the adoption of AI tools, and the growing interest in Large Language Model (LLM)–based chatbots. These studies provide insights into why users are beginning to shift from traditional search engines to AI-driven systems.

Baeza-Yates et al.[9] proposed that search engines should evolve into high-precision systems by incorporating contextual awareness and bidirectional feedback between users and the engine. They developed predictive models, including aggregated, Markovian, and time-distribution models, to analyze user interactions and improve document ranking and query recommendations. The study also highlighted that time spent on a

page serves as a strong indicator of user preference and relevance. Additionally, Baeza-Yates et al. noted the impact of ranking bias and the importance of supporting query refinement to better meet user information needs. These insights provide a foundation for understanding why users may increasingly prefer LLM-based AI chatbots, which offer direct, contextual, and personalized responses compared to traditional search engines.

User Web Search Behaviour paper by Kutub et al. [10] proposed that search engines should evolve into “decision engines” to provide more personalized and relevant search experiences. They suggested classifying users as Headophiles, who search popular terms, and Tailophiles, who focus on niche topics, to better tailor search recommendations. The authors also highlighted improvements such as personalized suggestions and enhanced Autocomplete based on both individual and group search behaviors. Their study, analyzing over 1.1 million web interactions from approximately 1,700 students, revealed that while 95 percentage of searches fall in the “head,” the “tail” contains many unique queries, indicating a need for better personalization. Additionally, they observed that peak search activity in student residential areas occurs between 21:00 and 04:00, emphasizing the importance of efficient resource and bandwidth management. These findings offer valuable insights into user search preferences, which are relevant for understanding the potential shift toward LLM-based AI chatbots in modern information-seeking behavior.

In the paper “Comparing Traditional and LLM-based Search for Image Geolocation”, Wazzan et al. [11] compared traditional keyword-based search (Microsoft Bing) with LLM-based conversational search (Bing Chat). They found that LLM users preferred longer, natural-language queries, while traditional search users used shorter, keyword-focused queries. LLM users rephrased queries instead of adding terms and treated the chatbot as a “knowledgeable assistant,” showing a different mental model. Although traditional search users performed slightly better in accuracy, LLMs offered more interactive and flexible search experiences, highlighting how conversational AI can influence user search behavior and preferences.

Liang et al. [12] examined how users interact with generative information retrieval systems such as Bing Chat compared to traditional search engines. Their study showed that users spend less effort in generative systems because answers are summarized, reducing the need to visit multiple web pages. Participants preferred the conversational interface and frequently used recommendation queries, with over half of the sessions requiring no clicks, signaling a satisfying search experience. Generative systems also led to higher accuracy on complex or mis-factual tasks, demonstrating improved task performance. These results suggest that LLM-based search tools can shape user behavior by providing efficient, interactive, and context-aware information retrieval.

Ren et al. [13] proposed BASES, a framework using LLM-based agents to simulate human web search behavior and better understand user intent and preferences. Their study highlighted that modern users increasingly formulate longer, natural-language queries, reflecting a shift from traditional keyword-based searches toward conversational interactions. By modeling multi-round query refinement and decision-making, the framework shows that LLM-driven systems can provide more personalized and

context-aware results compared to traditional search engines. Experiments demonstrated that simulations captured real human behavior with high accuracy and improved ranking quality, suggesting that chatbot-style interactions align better with evolving user expectations. These findings support the idea that users are moving from Google toward LLM-based chatbots for faster, more interactive, and user-friendly search experiences.

Ogilvie [14] evaluated Google AI systems, including Bard and Gemini, through a novel ethical framework based on modified Antisocial Personality Disorder (ASPD) criteria to assess hidden behaviors such as deceit, manipulation, and reckless decision-making. The study found that these AI systems met 5 of 7 ASPD criteria and caused measurable emotional distress in the user, highlighting potential trust and safety concerns in traditional search and AI systems. Ogilvie also noted instances of fabricated information and misrepresentation of oversight, suggesting that users may perceive misalignment and unreliability in such AI tools. The findings were validated independently by other LLMs like ChatGPT-4 and Claude 3.0, emphasizing that ethical and behavioral limitations can influence user preference toward more reliable and transparent LLM-based chatbots. This research supports the idea that concerns over AI behavior and trustworthiness contribute to the shift away from Google-based AI toward conversational LLM systems.

### 3 Methodology

This study used a survey-based approach to explore user search behavior and preferences. Data were collected anonymously using Google Forms, ensuring participant privacy and promoting candid responses. The survey included conceptual questions, multiple-choice items, and a short-paragraph section where respondents could describe their search tool preferences in their own words. The design avoided explicitly mentioning any specific search platform or AI tool to prevent response bias. The participants were primarily under 25 years of age, and all were familiar with AI-powered search tools. This demographic focus allowed the study to capture insights from younger users who are active digital natives and more likely to explore alternative search methods. Collected responses were analyzed using descriptive statistics, examining trends in preferred tools, query styles, interaction patterns, and overall engagement. This methodology enabled an unbiased, comprehensive view of user tendencies, providing insights into factors influencing the adoption of AI-based search systems.

#### 3.1 Data Collection and Analysis

The survey responses were cleaned and filtered before analysis to improve data quality. Incomplete or inconsistent entries were removed, and numerical and categorical data (such as screen time, age, and AI knowledge) were standardized. The cleaned dataset focused on active AI users below 25, providing insights into the emerging AI ecosystem. For analysis, descriptive statistics were calculated to summarize age, gender, education, AI awareness, and tool usage. Comparative analysis was conducted to explore differences between Large-Language Models and Google users, including

search choice, AI familiarity, and screen time. Data visualizations were used to highlight patterns and relationships, providing a clear view of why users are increasingly shifting toward AI-based conversational tools rather than the traditional models.

### 3.2 Equations

For the mathematical statistical analysis of the survey data, the mean (average) were calculated to summarize the central tendencies of numerical variables such as age, mobile screen time, and total screen time. In this study, the average (mean) was used primarily to determine the central value of the collected data. The equation for calculating the matrix is as follows as follows:

#### 3.2.1 Mean (Average)

The mean of a data set  $x_1, x_2, \dots, x_n$  is calculated by:

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n} \quad (1)$$

where  $x_i$  represents each individual observation and  $n$  is the total number of observations.

#### 3.2.2 Percentage (for categorical data)

For categorical variables such as first search choice or AI familiarity, percentages were calculated as:

$$\text{Percentage} = \frac{\text{Number of participants in category}}{n} \times 100 \quad (2)$$

These equations formed the foundation of the mathematical statistical analysis for the survey, enabling the identification of patterns and central tendencies in user behavior, particularly the shift from Google search to Large-Language Models usage.

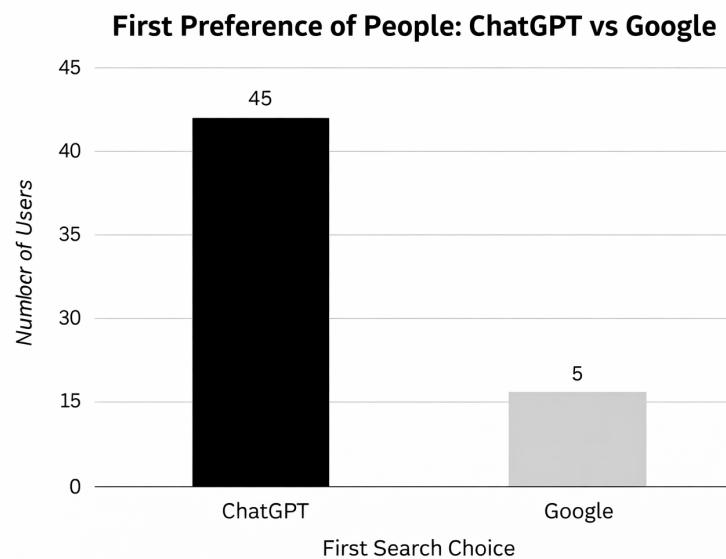
## 4 Analysis

This section presents the analysis of survey data collected from 50 participants to examine hidden insights. The dataset captures participants' demographics, technology usage patterns, AI awareness, and search behaviors, providing insights into factors influencing their choice of first search tool. The primary focus of this analysis is to identify trends in first search preference and explore potential correlations with various matrix. The analysis also aims to highlight patterns in AI adoption among young users, particularly those who actively use Chat-GPT as part of their daily information-seeking practices. To visualize these trends, the data will be presented graphical representations, allowing for a clear comparison.

### 4.1 First Preferences – Google vs Large Language Models

The survey results reveal a clear distinction between participants' first search preferences. Out of 50 respondents, 45 participants which is 90% reported using a large

language model (LLM) more even chatgpt, as their first search tool, while only 5 participants preferred Google which is 10%. This significant difference highlights the growing adoption of LLMs over traditional search engines among young users. Participants who preferred ChatGPT often reported familiarity with AI tools and an understanding of GPT technology. The ease of accessing direct, conversational answers appears to be a key factor influencing this preference. Additionally, higher average screen time among ChatGPT users suggests that individuals who spend more time on mobile or digital devices are more likely to adopt LLMs. A small proportion of participants still relied on Google as their first search tool. These users were primarily high school graduates with limited exposure to GPT-based tools. Despite using ChatGPT for other tasks, Google remains their initial choice for certain types of searches, possibly due to habitual use or perceived reliability.



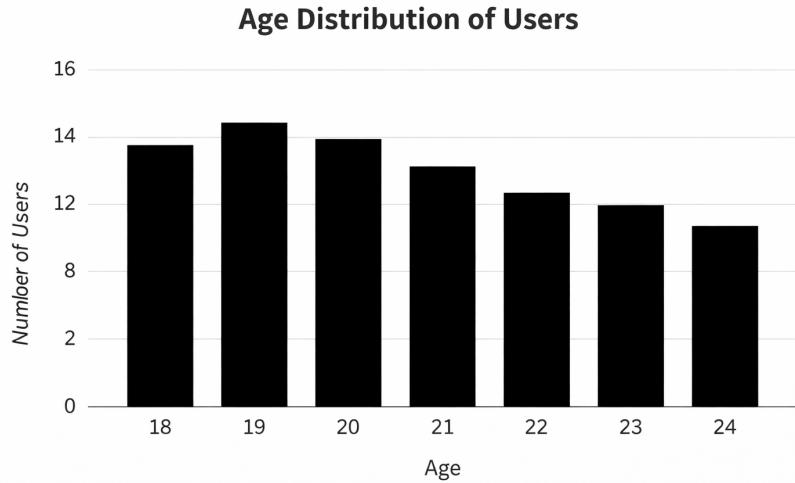
**Fig. 1** First Preferences – Google vs Large Language Models

The data indicates a clear shift toward LLMs as the preferred first choice for information retrieval. This trend reflects broader changes in how users interact with technology, favoring interactive AI-driven platforms over traditional search engines. Understanding these preferences is crucial for predicting the future adoption of LLMs and the potential impact on search behavior, information consumption, and digital literacy.

#### 4.2 Age Distribution and Trends in First Search Preference

The age distribution of survey participants ranges from 18 to 24 years, representing a young adult demographic. The age distribution indicates that the majority of users

are concentrated in the 19–22 age range, which corresponds to both high school graduates and college students. When examining first search preferences across age groups, a clear trend emerges: younger participants overwhelmingly prefer a large language model (LLM), over traditional search engines like Google. This preference is consistent across all ages in the surveyed group, with only a small fraction still opting for Google.



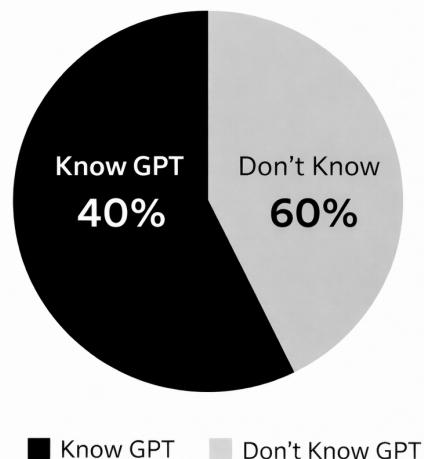
**Fig. 2** Age Distribution and the trend

This trend highlights that youth are increasingly focusing on LLMs for information retrieval, valuing the conversational and context-aware responses provided by AI over conventional search methods. The high adoption of Large-Language Models among younger users suggests a shift in digital behavior, where interactive AI tools are becoming the primary gateway for knowledge and problem-solving, potentially redefining the way the next generation engages with information online.

#### 4.3 GPT and Chatgpt Comparison

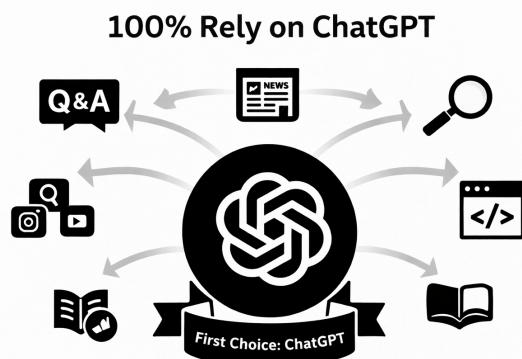
The survey results indicate that while a majority of participants are aware of ChatGPT and actively use it, only a smaller portion of respondents fully understand the underlying GPT models. Out of 50 participants, all reported having heard of AI, and almost all have interacted with ChatGPT. However, only about 40% of participants claimed to know GPT and ChatGPT perfectly, suggesting a gap between practical usage and technical understanding.

**People Familiar with GPT Model**



**Fig. 3** Familiarity on gpt models

This finding highlights an important trend: youth are increasingly relying on ChatGPT for information retrieval and other AI-assisted tasks, even if they do not fully comprehend the mechanics behind large language models (LLMs). Most users are familiar with the tool's interface and outputs, but their knowledge of GPT architecture, training methodology, and model capabilities remains limited.



**Fig. 4** Rely on Chatgpt

A striking result from the survey shows that all participants who use large language models (LLMs) prefer ChatGPT as their first search choice, completely overshadowing traditional search engines like Google.

## 5 Discussion

The evolution of information access has undergone a continuous transformation, beginning with postal services and printed newspapers, transitioning to digital search engines such as Google, and now advancing toward personalized large language models (LLMs). This study demonstrates that search behavior is no longer static but evolves alongside technological innovation. The findings clearly indicate that users, particularly younger generations, are rapidly shifting from traditional, keyword-based search engines to AI-driven, conversational systems. The results reveal a massive surge in the adoption of LLMs, with ChatGPT emerging as the most popular and preferred model for first-search queries. This outcome is particularly striking, as it highlights not only widespread usage but [15] also strong trust in LLMs as primary sources of information. The data further suggest that users value personalization, efficiency, and direct problem-solving, which LLMs provide more effectively than conventional search platforms. Based on these trends, it is reasonable to predict that LLMs will play an increasingly [16] central role in solving everyday problems in the coming years, ranging from academic assistance to decision-making and knowledge discovery. The dominance of ChatGPT observed in this study underscores the transformative impact of large language models and signals a broader shift toward AI-centric information ecosystems, shaping the future of search and human-computer interaction.

## 6 Implications of the Study

The study also shows that the increasing use of Large Language Models (LLMs) is associated with a major rise in screen time. As users depend more on AI tools for searching, learning, and problem-solving, their daily digital engagement continues to grow. According to the survey responses, many participants also expressed concerns about data security and privacy while using AI-based platforms. In addition, increased reliance on LLMs may reduce face-to-face social interaction, highlighting the need for balanced and responsible use of these technologies.

To analyze the survey data, we computed the mean (average) screen time for participants. Let  $x_i$  denote the mobile screen time of the  $i^{th}$  participant and  $y_i$  denote the total screen time of the  $i^{th}$  participant, where  $i = 1, 2, \dots, n$ , and  $n = 50$  is the total number of participants.

The mean mobile screen time  $\bar{X}$  is calculated as:

$$\bar{X} = \frac{1}{n} \sum_{i=1}^n x_i \quad (3)$$

The mean total screen time  $\bar{Y}$  is calculated as:

$$\bar{Y} = \frac{1}{n} \sum_{i=1}^n y_i \quad (4)$$

Substituting the survey data, we obtained:

$$\bar{X} = \frac{9 + 10 + 11 + 12 + 8 + \dots + 12 + 8}{50} \approx 10 \text{ hours} \quad (5)$$

$$\bar{Y} = \frac{11 + 12 + 13 + 14 + 10 + \dots + 14 + 10}{50} \approx 12 \text{ hours} \quad (6)$$

Thus, the average screen time among participants is summarized in Table 1.

**Table 1** Average Screen Time of Participants

Screen Type	Average (hrs)
Mobile Screen Time	10
Total Screen Time	12

The survey data shows that participants spend a substantial amount of time on screens daily. On average, mobile screen time is approximately 10 hours, while total screen time reaches around 12 hours per day. This indicates a significant engagement with digital devices, highlighting the growing reliance on technology and large language models for daily activities.

## 7 Conclusion

This study highlights the rapid shift in user behavior from traditional search engines like Google to large language models, particularly ChatGPT, as the primary choice for information retrieval. Survey results show that most participants, especially younger users, prefer ChatGPT for their first search, demonstrating a strong adoption of AI-powered tools. The data also reveals increased screen time, with an average of 10 hours on mobile devices and 12 hours total, reflecting the growing dependence on digital platforms. While AI tools offer convenience and personalized assistance, concerns about security, privacy, and reduced social interaction remain significant. Overall, the findings emphasize the transformative impact of large language models on daily digital habits and suggest that their influence will continue to expand in the coming years.

## References

- [1] Chen, R., Kraemer, K.L., Sharma, P.: Google: The world's first information utility? *Business Information Systems Engineering* **1**(1), 53–61 (2009)
- [2] Shethiya, A.S.: Rise of llm-driven systems: Architecting adaptive software with generative ai. *Spectrum of Research* **3**(2) (2023)

- [3] Sublime, J., Renna, I.: Is chatgpt massively used by students nowadays? a survey on the use of large language models such as chatgpt in educational settings. arXiv preprint arXiv:2412.17486 (2024)
- [4] Seymour, T., Frantsvog, D., Kumar, S.: History of search engines. International Journal of Management Information Systems (IJMIS) **15**(4), 47–58 (2011)
- [5] Caufield, J.: Where did google get its value? portal: Libraries and the Academy **5**(4), 555–572 (2005)
- [6] Boroumand, A., *et al.*: Google workloads for consumer devices: Mitigating data movement bottlenecks. In: Proceedings of the Twenty-Third International Conference on Architectural Support for Programming Languages and Operating Systems (2018)
- [7] Sánchez Cuadrado, J., *et al.*: Automating the development of task-oriented llm-based chatbots. In: Proceedings of the 6th ACM Conference on Conversational User Interfaces (2024)
- [8] Salim, M.S., *et al.*: Llm based qa chatbot builder: A generative ai-based chatbot builder for question answering. SoftwareX **29**, 102029 (2025)
- [9] Baeza-Yates, R., *et al.*: Modeling user search behavior. In: Third Latin American Web Congress (LA-WEB'2005) (2005)
- [10] Kutub, M., Prachetaa, R., Bedekar, M.: User web search behaviour. In: 2010 3rd International Conference on Emerging Trends in Engineering and Technology (2010)
- [11] Wazzan, A., MacNeil, S., Souvenir, R.: Comparing traditional and llm-based search for image geolocation. In: Proceedings of the 2024 Conference on Human Information Interaction and Retrieval (2024)
- [12] Liang, Y., *et al.*: How users interact with generative information retrieval systems: A study of user behavior and search experience. In: Proceedings of the 48th International ACM SIGIR Conference on Research and Development in Information Retrieval (2025)
- [13] Ren, R., et al.: Bases: Large-scale web search user simulation with large language model based agents. arXiv preprint arXiv:2402.17505 (2024)
- [14] Ogilvie, A.D.: Antisocial analogous behavior, alignment and human impact of google ai systems: evaluating through the lens of modified antisocial behavior criteria by human interaction, independent llm analysis, and ai self-reflection. arXiv preprint arXiv:2403.15479 (2024)
- [15] Escotet, M.: The optimistic future of artificial intelligence in higher education.

Prospects **54**(3), 531–540 (2024)

- [16] Paaß, G., Hecker, D.: Artificial Intelligence: What Is Behind the Technology of the Future? Springer