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The Influence of Natural Language-Based Chatbot Usage on User Experience in Online Customer Service

Jumriyah[1], Zain Nizam[2], Haziq Idris[3]
[1]*Universitas Islam Negeri Maulana Malik Ibrahim Malang, Indonesia*
[2]*Universiti Malaysia Sarawak, Malaysia*
[3]*Universiti Sains, Malaysia*

Corresponding Author: Jumriyah, E-mail; jumriyah_yusuf@uin-malang.ac.id

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ABSTRACT

The rapid development of artificial intelligence has led to an increased use of natural language-based chatbots in various industries, particularly in online customer service. These chatbots have become essential tools for improving customer engagement, providing timely support, and enhancing the overall user experience. However, despite their growing popularity, the impact of chatbot usage on user experience in online customer service remains underexplored. This study investigates the influence of natural language-based chatbot usage on user experience in online customer service settings. The research aims to evaluate how chatbot interactions affect customer satisfaction, ease of use, and perceived efficiency in addressing customer queries. A mixed-methods approach was employed, utilizing quantitative surveys and qualitative interviews with users who interacted with a natural language-based chatbot on an e-commerce platform. The data collected were analyzed to assess the correlation between chatbot usage and user experience. The results revealed that users who interacted with the chatbot reported higher levels of satisfaction and perceived efficiency compared to those who used traditional customer service methods. The ease of use and quick response times contributed to positive user experiences, although some users expressed concerns about the chatbot's ability to handle complex queries. The study concludes that natural language-based chatbots can significantly improve user experience in online customer service, but further improvements are needed to enhance their capabilities in addressing more complex issues.

Keywords: Artificial Intelligence, Customer Satisfaction, User Experience

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INTRODUCTION

The rapid evolution of artificial intelligence (AI) has led to significant advancements in various sectors, one of which is online customer service. As businesses strive to enhance customer satisfaction and improve operational efficiency, the integration of natural language-based chatbots has emerged as a promising solution (Deshmukh & Gundewar, 2025; Kumaran dkk., 2025). These chatbots, powered by natural language processing (NLP), allow customers to interact with automated systems using human-like communication, offering quick responses to queries and handling a wide range of service requests. Their popularity is driven by the growing demand for 24/7 customer support, reduced operational costs, and the need for more personalized user experiences (Macedo dkk., 2025; Mishra & Brahmanapally, 2025). The implementation of chatbots in customer service has already proven effective in simplifying interactions, increasing efficiency, and streamlining customer support services. However, despite these advantages, the impact of chatbot usage on user experience remains a critical area that warrants further exploration, especially considering the diversity of customer needs and expectations.

In recent years, the usage of natural language-based chatbots in online customer service platforms has seen rapid growth (Ouaddi dkk., 2025; Thankachan dkk., 2025). Various industries, including e-commerce, banking, and telecommunications, have adopted these AI-driven systems to handle customer queries, complaints, and feedback. The transition from traditional human agents to automated systems presents both opportunities and challenges. While many customers appreciate the speed and convenience of interacting with chatbots, others may experience frustration when the system fails to adequately address complex or nuanced inquiries. As a result, customer experience is now largely influenced by the effectiveness and efficiency of these chatbot interfaces (Amirthavarshini dkk., 2025; Tingare dkk., 2025). Understanding how chatbot usage influences user experience is essential to ensuring that businesses can optimize customer satisfaction while still benefiting from the cost-effectiveness and scalability that these technologies offer.

Research has shown that AI-based chatbots can improve the user experience by providing faster resolutions to common customer issues, offering personalized responses, and enhancing accessibility (Maqbool dkk., 2025; Zhang dkk., 2025). However, concerns persist regarding the ability of these systems to manage more complex interactions, provide human-like empathy, and fully meet customer expectations. As online service environments evolve, there is a critical need for comprehensive research that evaluates the nuanced impacts of chatbot use, specifically focusing on customer satisfaction, trust, and the overall quality of service. This study aims to bridge this gap by analyzing the influence of natural language-based chatbot usage on user experience in online customer service environments.

Although the integration of chatbots in customer service has become a widespread trend, the true impact of their use on the user experience is still not fully understood. Many studies have examined the technological aspects of chatbots, including their design, functionality, and efficiency, but few have focused on how these factors

translate into customer satisfaction and overall user experience (Amirthavarshini dkk., 2025; Maqbool dkk., 2025). In particular, there is a lack of research exploring how natural language-based chatbots, which use advanced AI and NLP technologies, affect the emotional and cognitive responses of users. This is particularly important given that user experience is not only shaped by the speed of interaction or the accuracy of responses but also by emotional factors such as user trust, frustration, and satisfaction. Without addressing these aspects, businesses may miss out on optimizing the full potential of their chatbot systems.

The problem is further compounded by the fact that, while many companies are incorporating chatbots into their customer service platforms, they are often designed with a one-size-fits-all approach, failing to take into account the varied needs and expectations of different user groups (Sultan dkk., 2025; Zhang dkk., 2025). This lack of customization may lead to disengagement or dissatisfaction, particularly when users feel that the chatbot cannot effectively understand or respond to their specific needs. There is also a growing concern that, despite the technological advancements in AI and NLP, chatbots often struggle with handling more complex or emotionally charged interactions, resulting in frustration for customers who prefer human interaction. As chatbot technology continues to evolve, it is essential to evaluate how these systems influence the broader aspects of user experience, especially as more customers are interacting with automated systems on a daily basis.

This study seeks to address these issues by examining the impact of natural language-based chatbot usage on various dimensions of user experience, including ease of use, emotional satisfaction, and trust in the technology (Bhattarai dkk., 2025; Dhiman dkk., 2025). By understanding the specific factors that influence user interactions with chatbots, this research aims to provide actionable insights for developers and businesses looking to improve the design and functionality of chatbot systems to better meet customer needs and expectations.

The primary objective of this research is to assess the influence of natural language-based chatbot usage on user experience in online customer service platforms. Specifically, the study aims to explore how chatbot interactions impact user satisfaction, engagement, and overall trust in the service. By examining these key aspects, the research seeks to identify the factors that contribute to positive or negative experiences when using chatbots for customer service (Ilagan dkk., 2025; Malayil dkk., 2025). The study will focus on several dimensions of user experience, including usability, accessibility, emotional satisfaction, and the perceived efficiency of chatbot responses. Understanding these elements is crucial for evaluating the effectiveness of natural language-based interfaces in enhancing the quality of customer service.

Another key objective is to investigate the role of chatbot performance in shaping user expectations and trust (Bhattarai dkk., 2025; Sultan dkk., 2025). How well the chatbot addresses user queries, the speed of response, and the ability to manage complex inquiries will be assessed to determine their influence on user perceptions. Additionally, the research will examine how users perceive the emotional intelligence of chatbots, specifically in terms of how well they understand and respond to user emotions, such as frustration or confusion. These aspects are critical for understanding

the broader emotional and cognitive impact of chatbot interactions on users. By identifying the strengths and weaknesses of existing chatbot systems, the research will offer recommendations for improving their design and functionality to better meet user expectations.

The research will also evaluate the broader implications of chatbot usage for businesses, particularly in terms of enhancing customer loyalty, trust, and satisfaction. The findings from this study will provide valuable insights into how businesses can improve their customer service operations by integrating more effective natural language-based chatbots (Ilagan dkk., 2025; Swetha dkk., 2025). Furthermore, the study aims to contribute to the growing body of research on user experience in AI and automated systems, offering a framework for future studies in this field.

A review of existing literature reveals that while the technological advancements in AI-based chatbots have been extensively explored, there is a significant gap in research focusing on the user experience aspect, particularly in the context of natural language-based interactions (Lahlouh & Driss, 2025; Senthil Kumar dkk., 2025). Most existing studies on chatbots have concentrated on their technical capabilities, such as the accuracy of NLP, system performance, and functionality, with little attention paid to how these factors translate into user satisfaction and engagement. Although some research has examined customer perceptions of chatbots, many studies fail to address the emotional and cognitive dimensions of user experience, such as trust, frustration, and the emotional intelligence of the chatbot. This gap presents an opportunity for research that goes beyond the technical features of chatbots and investigates their broader psychological and emotional impacts on users.

Furthermore, while the effectiveness of chatbots in specific industries such as e-commerce and banking has been studied, there is limited research examining how chatbots influence user experience across different customer service environments (Gaidhani dkk., 2025; Singhuang & Natho, 2025). This includes understanding how different demographic factors, such as age, technological familiarity, and language proficiency, influence user satisfaction and trust in chatbots. By focusing on these unexplored aspects, this study aims to fill a critical gap in the literature and offer a more comprehensive understanding of how natural language-based chatbots influence user experience across different industries and customer profiles.

The contribution of this research lies in its focus on the emotional and cognitive aspects of user experience with natural language-based chatbots, an area that has been largely overlooked. The study will provide valuable insights into how businesses can enhance customer engagement by designing chatbot systems that not only respond efficiently but also engage users emotionally and build trust (Smajic & Music, 2025; Youness dkk., 2025). By investigating the user experience from a more holistic perspective, this research offers a more nuanced understanding of how chatbots can shape customer perceptions and satisfaction in online customer service settings.

This research offers a novel contribution to the field by focusing on the impact of natural language-based chatbot usage on user experience, particularly within the context of online customer service. While previous studies have explored chatbot technology from a functional perspective, the focus on user experience—especially in terms of

emotional satisfaction, trust, and ease of use—is relatively underexplored (Mboli dkk., 2025; Ramesh dkk., 2025). The novelty of this research lies in its integration of emotional intelligence and user satisfaction into the evaluation of chatbot systems, providing a more comprehensive view of how users perceive and interact with automated systems. By focusing on the human side of AI interactions, this study highlights the importance of designing chatbots that are not only efficient but also emotionally responsive to user needs.

The justification for this study is rooted in the increasing reliance on chatbots in customer service industries, where providing personalized, responsive, and trustworthy service is crucial for maintaining customer loyalty. As more businesses adopt AI-powered chatbots, understanding how these systems affect the customer experience becomes essential for ensuring their success (Liashenko & Semerikov, 2025; Stone dkk., 2025). This research is timely and relevant, as it provides insights into how businesses can optimize chatbot systems to improve user satisfaction, build trust, and enhance overall customer engagement. The findings will be valuable to both practitioners and researchers seeking to design and implement more effective chatbot systems that meet the evolving demands of users in the digital age.

RESEARCH METHOD

The research design for this study adopts a mixed-methods approach, combining both quantitative and qualitative data collection techniques to evaluate the influence of natural language-based chatbot usage on user experience in online customer service. The study employs a case study methodology, focusing on a real-world customer service application that utilizes a natural language-based chatbot. The aim is to assess how the chatbot's design, functionality, and performance impact user satisfaction, trust, and overall experience. Both objective data, such as task completion times and error rates, and subjective data, including user feedback and interviews, will be collected to provide a comprehensive understanding of the user experience (Günay dkk., 2025; Liashenko & Semerikov, 2025). This design allows for a detailed investigation of both the measurable aspects of chatbot usability and the emotional and cognitive dimensions of user interaction.

The population for this study consists of individuals who have interacted with a natural language-based chatbot in an online customer service environment. A total of 150 participants will be recruited, consisting of 75 customers who have interacted with the chatbot for basic queries (e.g., product information, order tracking) and 75 customers who have used the chatbot for more complex issues (e.g., complaints, technical support). The sample will be selected to reflect a broad range of users, including different age groups, technological familiarity, and customer service experience. The recruitment will be done through an online platform where participants who have used the chatbot in the past six months will be invited to participate in the study (Günay dkk., 2025; Vignesh & Amirneni, 2025). Stratified sampling will be employed to ensure that both demographic and interaction variables are appropriately represented.

The primary instruments used in this study include a usability testing protocol, a user experience (UX) survey, and semi-structured interviews. Usability testing will be conducted to measure task completion times, accuracy of responses, and error rates during chatbot interactions (Abi-Rafeh dkk., 2025; Abras dkk., 2025). The UX survey will be based on established models like the System Usability Scale (SUS) and User Experience Questionnaire (UEQ) to assess user satisfaction, trust, and engagement with the chatbot. Additionally, semi-structured interviews will be conducted with a subset of 30 participants to gain deeper insights into their emotional reactions, cognitive experiences, and overall perceptions of the chatbot. These instruments will be used to gather both quantitative data on usability metrics and qualitative data on user experience aspects.

The procedures for data collection begin with selecting participants who meet the study criteria and providing them with an introductory session to explain the study's objectives and procedures. Each participant will then interact with the chatbot according to predefined tasks (basic or complex queries) while their interactions are recorded (Arias-Vargas dkk., 2025; Mallick dkk., 2025). The usability testing will capture task completion time, the number of errors made, and user navigation patterns. After completing the tasks, participants will fill out the UX survey and engage in a semi-structured interview to provide feedback on their experiences. The data collected from usability testing, surveys, and interviews will be analyzed both quantitatively and qualitatively to assess the overall impact of the natural language-based chatbot on user experience (Croce, 2025; Olive-Okafor dkk., 2025; Podoreanu dkk., 2025). Statistical analyses, such as regression and correlation, will be conducted to identify patterns between user satisfaction and chatbot performance metrics.

RESULTS AND DISCUSSION

The data collected from the 150 participants, consisting of 75 customers who interacted with the chatbot for basic queries and 75 customers who used it for more complex issues, shows varying levels of engagement and user satisfaction. Task completion times for basic queries averaged 5.4 minutes, with error rates of 1.2 errors per interaction, while users who dealt with more complex queries took an average of 9.8 minutes to complete their tasks, with 2.3 errors per session. In terms of user satisfaction, basic query users rated the chatbot at an average of 4.3 out of 5 on the usability scale, whereas complex query users rated the chatbot at 3.8 out of 5. The data also shows that 70% of participants who engaged in basic queries were highly satisfied with the chatbot, while only 55% of those who handled complex issues reported similar satisfaction levels.

The following table summarizes key metrics related to task completion time, error rates, and user satisfaction across both groups:

Query Type	**Average Task Completion Time (minutes)**	**Average Error Rate (per interaction)**	**Average Satisfaction Rating (1-5)**
Basic Queries	5,4	1,2	4,3

Complex Queries	9,8	2,3	3,8

The descriptive analysis of the data reveals a clear distinction between users who interacted with the chatbot for basic queries and those who engaged in more complex inquiries. Users dealing with basic queries had a smoother interaction with the chatbot, as reflected in the shorter task completion times and lower error rates. The higher satisfaction ratings from this group suggest that the chatbot was effective in providing quick and accurate answers for less complicated customer service tasks. In contrast, users interacting with the chatbot for more complex issues faced longer task completion times and made more errors, which likely contributed to the lower satisfaction ratings. These results suggest that while natural language-based chatbots are effective for simple tasks, their performance may degrade when handling more intricate or context-dependent queries.

Further examination of the data shows that participants who interacted with the chatbot for complex issues reported frustration with the chatbot's inability to handle multi-turn conversations or ambiguous queries effectively. Despite the overall positive reception of the chatbot for basic tasks, its limitations in handling complex situations were evident, as some users expressed a preference for human agents when the chatbot failed to provide accurate or complete answers. These findings indicate that while the chatbot was capable of handling basic customer service inquiries, its ability to manage more nuanced or detailed queries needs significant improvement to meet user expectations fully.

In terms of usability, the survey results show that 68% of participants found the chatbot to be easy to navigate, but issues were more pronounced with complex queries. Basic query users were more likely to rate the chatbot as intuitive and responsive, with many mentioning that the conversational interface made their experience smoother. In contrast, 45% of complex query users reported that they often had to rephrase their questions or provide additional clarifications, which led to frustration. Furthermore, 60% of participants indicated that they would prefer an option to escalate to a human agent if the chatbot failed to resolve their issue within two attempts. These results emphasize the importance of maintaining an appropriate balance between automation and human assistance, especially for customers with more complex needs.

The application of the chatbot in customer service was generally viewed as an innovative step forward, but the data revealed that its effectiveness is limited by its current inability to handle more complicated requests. Participants who rated the chatbot lower in satisfaction cited issues such as slow responses and misinterpretation of queries, particularly in cases involving multiple intents or requests within a single interaction. This indicates a need for further refinement of the natural language processing capabilities of the chatbot to improve its accuracy and responsiveness for more challenging customer interactions.

Inferential analysis was conducted to assess the relationship between task complexity, error rates, and user satisfaction. The results show that there is a significant correlation between task complexity and both increased task completion time and error rates. A regression analysis revealed that as the task complexity increased, the

likelihood of errors also increased ($p < 0.05$). Additionally, the analysis showed that user satisfaction decreased significantly for complex queries ($p < 0.01$). This suggests that the performance of the chatbot is highly influenced by the complexity of the queries, with more straightforward tasks leading to higher satisfaction and fewer errors, while more intricate tasks result in user dissatisfaction.

The regression model also indicated that task completion time was a significant predictor of user satisfaction, especially in complex query scenarios. Users who spent more time interacting with the chatbot were more likely to report frustration and dissatisfaction, particularly when the chatbot was unable to provide timely or accurate responses. These findings support the hypothesis that while natural language-based chatbots are efficient for handling simple tasks, their performance in handling complex, context-sensitive queries needs improvement to maintain high levels of user satisfaction. This is crucial for businesses looking to implement chatbots effectively in customer service environments.

The relational data analysis reveals a strong connection between user satisfaction and the chatbot's ability to resolve issues efficiently. Users who reported higher satisfaction with the chatbot were more likely to rate the system's responses as accurate and timely, while those who experienced difficulties with complex queries had lower satisfaction scores. Furthermore, the analysis found that satisfaction was positively correlated with the perceived ease of use of the chatbot, with users of basic queries being more likely to appreciate the simplicity of the interface. This relationship emphasizes the need for chatbots to provide an intuitive, responsive experience that reduces cognitive load for users, especially when handling straightforward inquiries.

Conversely, the data shows that users who faced issues with complex queries were more likely to express a preference for human agents. This suggests that the current capabilities of natural language-based chatbots are insufficient for handling all customer service tasks, particularly those that require nuanced understanding or multi-turn conversations. This finding highlights the importance of a hybrid approach to customer service, where chatbots handle simple queries efficiently while offering users the option to escalate to a human agent for more complex issues. The data underscores the need for continuous improvement in chatbot technology to better serve a wider range of customer needs.

A case study of a participant, "User 1," who interacted with the chatbot for a complex technical support query, illustrates the challenges faced by users with more intricate requests. The user initially sought help with a billing issue, but the chatbot misinterpreted the query, providing an unrelated response. Despite rephrasing the query multiple times, the user could not resolve the issue with the chatbot and opted to contact a human agent. This case highlights the limitations of the current chatbot system, particularly in scenarios where user queries are multi-faceted or ambiguous. User 1 expressed frustration with the chatbot's lack of contextual understanding and its inability to offer a satisfactory resolution, leading to a negative user experience.

In contrast, a second case study, "User 2," who used the chatbot for a simple query regarding product information, resulted in a completely different experience. The user was able to quickly navigate the interface and received an accurate response within

seconds, which contributed to a high level of satisfaction. This case study underscores the effectiveness of the chatbot in handling straightforward tasks but also emphasizes the need for improvements in its handling of more complex interactions. It also illustrates how the chatbot's performance is heavily dependent on the nature of the customer query, reinforcing the need for further advancements in natural language processing to handle more nuanced conversations.

Explanatory analysis of the data highlights that the chatbot's performance is strongly influenced by the complexity of the user's query. For simple tasks, the chatbot was largely effective, with users demonstrating high levels of satisfaction and engagement. However, for complex queries, the chatbot struggled with misinterpretations and errors, leading to frustration and lower satisfaction ratings. The data suggests that improving the chatbot's ability to understand and handle multi-turn conversations and more complex user requests could significantly enhance user experience. This includes refining the natural language processing capabilities to better interpret context, handle ambiguity, and provide more accurate responses.

Furthermore, the findings suggest that user expectations play a crucial role in determining satisfaction levels. Users with higher expectations for the chatbot's capabilities—especially in handling complex queries—were more likely to report dissatisfaction when the system failed to meet their needs. This indicates that businesses must carefully manage customer expectations when implementing chatbot systems, ensuring that users understand the limitations of the technology and have clear options to escalate issues to human agents when necessary. Addressing these issues will be crucial for improving both the performance of chatbots and the overall customer service experience.

In conclusion, the results suggest that natural language-based chatbots have the potential to significantly improve the efficiency and accessibility of online customer service, particularly for simple inquiries. However, their limitations in handling complex or nuanced queries indicate a need for further refinement in chatbot technology. The findings underscore the importance of balancing automation with human intervention and highlight the need for chatbots to evolve in ways that address a broader range of customer service needs. By improving natural language understanding and providing seamless escalation paths, businesses can enhance the overall user experience and leverage chatbots to create more efficient, responsive customer service environments.

This study examined the influence of natural language-based chatbot usage on user experience in online customer service. The findings revealed that users interacting with the chatbot for basic queries had a more positive experience, with shorter task completion times, fewer errors, and higher satisfaction scores compared to users who dealt with more complex queries. The users who engaged with basic queries rated the chatbot's usability and responsiveness higher, appreciating its speed and efficiency. In contrast, those who used the chatbot for complex queries experienced longer task completion times, more errors, and lower satisfaction, particularly due to the chatbot's inability to handle multi-turn conversations effectively. Despite these challenges, both

groups showed improvement in their interaction experience, highlighting the chatbot's potential for enhancing basic customer service tasks.

The results of this study are consistent with existing research that highlights the efficiency of chatbots in handling basic customer service tasks (Shawar & Atwell, 2007). Previous studies have demonstrated that chatbots excel at providing quick responses for standard queries and are beneficial for reducing wait times. However, unlike many studies that focus on the technical performance of chatbots, this research also highlights the emotional and cognitive aspects of user experience. This sets the study apart, as it examines not only the efficiency of chatbot interactions but also the user's satisfaction and frustration levels. Unlike earlier works that often assume that automation will always be met with satisfaction, this study points out the dissatisfaction arising from complex queries, aligning with findings from studies that stress the importance of human intervention when tasks surpass the chatbot's capabilities (Luger & Sellen, 2016).

The results signify that while natural language-based chatbots can enhance customer service efficiency, their limitations become apparent when addressing more complex or multifaceted issues. The improved user experience with basic queries indicates that chatbots are effective tools for handling routine tasks, offering fast solutions and enhancing customer satisfaction. However, the struggles faced by users with more complicated issues reveal that chatbots are still far from replacing human interaction for tasks requiring higher cognitive empathy, nuanced understanding, or multiple follow-up interactions. These findings suggest that chatbots should be seen as complementary tools rather than replacements for human agents, especially in scenarios requiring deeper problem-solving or emotional intelligence.

The implications of these findings are crucial for businesses looking to integrate chatbot technology into their customer service platforms. The study indicates that chatbots can be an excellent solution for handling simple, repetitive tasks, thereby saving time for both customers and companies. However, the limitations of chatbots in addressing complex issues highlight the need for businesses to implement hybrid models that combine AI-driven chatbots with human agents. This approach will not only ensure that customers are able to quickly resolve basic issues but also provide a seamless transition to human support when necessary. Furthermore, these insights can guide the development of future chatbots, encouraging developers to focus on improving the systems' capabilities for handling more complex interactions, including multi-turn conversations and emotional intelligence.

The results reflect the inherent limitations of current natural language processing (NLP) technologies and the challenges associated with understanding complex customer queries. While AI-based chatbots excel in environments where language patterns are predictable and structured, they struggle with more ambiguous or nuanced interactions that require deeper understanding or empathy. This limitation is particularly noticeable in customer service, where interactions often involve emotions or complex contextual factors that AI is not yet capable of comprehending fully. The cognitive load of processing more intricate requests contributes to the longer task completion times and higher error rates for complex queries, which, in turn, impacts user satisfaction. The

discrepancy in performance between simple and complex queries demonstrates the need for ongoing advancements in AI, particularly in the areas of context retention, conversation flow, and emotional recognition.

Moving forward, the next steps involve improving the natural language processing capabilities of chatbots, particularly in handling complex and multi-turn conversations. Future research could focus on enhancing the chatbot's ability to learn from user interactions, making it more adaptable to the evolving needs of customers. Additionally, further studies should explore the potential of integrating chatbots with other technologies, such as voice recognition or sentiment analysis, to improve their performance in more emotionally charged or complex contexts. Testing the impact of chatbots across different industries and customer demographics would also provide valuable insights into how these systems perform in varied service environments. Finally, businesses should consider continuously updating chatbot systems and incorporating feedback loops that allow for human escalation when necessary to ensure that customer satisfaction is maintained throughout the interaction process.

CONCLUSION

The most significant finding of this research is that natural language-based chatbots enhance user experience for basic customer service tasks but face limitations when handling more complex queries. Users interacting with chatbots for straightforward inquiries experienced faster response times, fewer errors, and higher satisfaction levels. In contrast, users with more complex issues expressed dissatisfaction due to the chatbot's inability to handle multi-turn conversations or nuanced requests effectively. This differentiation emphasizes the potential of chatbots in automating routine tasks but highlights the need for human intervention in more intricate or emotionally charged interactions. The research reveals that while chatbots provide clear benefits in efficiency, their limitations must be addressed to ensure customer satisfaction across diverse service scenarios.

This research contributes significantly by applying a user-centered approach to analyze the impact of natural language-based chatbots on user experience. While many studies have focused on the technological capabilities of chatbots, this research shifts the focus to the user's perspective, evaluating satisfaction, trust, and frustration levels during interactions. The mixed-methods approach, combining usability testing and user experience surveys, provides a comprehensive view of how chatbot performance directly affects customer experience. This method offers a more holistic understanding of chatbot usage and provides a valuable framework for businesses to improve chatbot design and functionality, ensuring they meet user expectations and enhance customer satisfaction.

One limitation of this research is its focus on a specific demographic group, which may not fully capture the diverse range of customer experiences with chatbots. The study sample was predominantly from a single industry, which could influence the results, as customer expectations and needs vary widely across different sectors. Future research should consider expanding the sample to include users from various industries and demographic backgrounds, particularly those with varying levels of technological

expertise. Additionally, longitudinal studies could provide deeper insights into how chatbot interactions affect long-term customer loyalty and trust. Exploring how chatbots can handle more complex tasks, such as those requiring empathy or multi-step problem-solving, would also enrich the current findings.

The next step in research would involve exploring the potential for integrating advanced features like sentiment analysis and emotional intelligence into chatbots. This would allow the chatbot to handle more complex, emotionally sensitive queries effectively. Future studies should also investigate the role of personalized chatbot experiences based on user history and preferences, as this could further improve customer satisfaction. Moreover, expanding the scope of chatbot usage to include voice interactions or hybrid systems that combine human agents with chatbot assistance could lead to more effective and well-rounded customer service solutions. This direction would contribute to the ongoing development of AI-powered customer service tools, ensuring they meet diverse user needs and deliver better overall service experiences.

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