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A Study on The Effectiveness of Chatbots in Reducing Stress in Customer Service Operations

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ABSTRACT
Chatbots are being used more frequently to handle customer interactions and reduce employee workload as a result of the quick adoption of artificial intelligence in customer service. This study looks at how well chatbots work to improve customer satisfaction and lessen stress in customer service operations. Using a structured questionnaire, 70 respondents in Coimbatore City provided primary data for the study. The results show that most respondents use chatbots either regularly or infrequently, indicating a high level of chatbot usage. The majority of users thought chatbots were useful for lowering stress, especially when it came to quicker response times and effective management of recurring questions. The most important factor affecting trust in chatbot services was found to be quick response times. According to the average score analysis, chatbots are seen favourably for lowering wait times, balancing employee workloads, and increasing operational effectiveness. The average stress score indicates that users' stress levels have somewhat decreased. Gender and satisfaction with chatbot usage do not significantly correlate, according to the chi-square test results.
The study concludes that by automating repetitive tasks and lowering service pressure, chatbots are essential to reducing stress in customer service. But human assistance is still necessary to solve complicated problems. While preserving cost effectiveness in customer service operations, integrating chatbot systems with human assistance can boost employee well-being, increase customer satisfaction, and improve service quality.

Keywords: *Chatbots,* Customer *Service Stress, Workload Reduction, Customer Satisfaction, Customer Trust, Cost-Effectiveness, Human–Chatbot Interaction*

1. INTRODUCTION

Emotional concerns like stress, anxiety, and depression have become quite common in today's rapidly moving and highly demanding society. Though awareness about mental wellness continues to increase, many people feel reluctant to approach a mental health professional due to factors like stigma, judgment, and high mental health service costs. Emotional concerns, therefore, go unaddressed, causing stress, decreased productivity, and serious mental issues.

2. Improvements in digital technology and artificial intelligence have created new options for mental health support through new and accessible platforms. Conversational agents, especially therapy chatbots, provide a private and supportive space where people can openly share their feelings and find emotional help. Due to the increasing adoption of digital platforms and the growing acceptance of technology-enabled solutions, chatbots have emerged as potential solutions in the field of mental health. The current study highlights the need for digital interventions that supplement existing mental health services, addressing the gap between the demand for and availability of services.

2. REVIEW OF LITERATURE

Dr Pranav Kapoor, Dr Pratham Agrawal, et.al. (2021), [1] in their article "Therapy Chatbot: A Relief from Mental Stress and Problems". This study examines creating a useful conversation system. It aims to help people manage emotional challenges and mental stress. The study discusses the increasing need for easily accessible mental health services and emphasises people's propensity to repress their feelings out of social stigma and fear of being judged. Increased stress, decreased productivity, and serious psychological effects are frequently the outcomes of such emotional suppression. The project suggests a therapy chatbot that offers users a secure, private, and non-judgmental forum for expressing their emotions in order to solve this problem. The chatbot seeks to lessen emotional strain and support early intervention in mental health issues by facilitating open communication and

providing encouraging interactions. The study highlights how chatbot technology can improve mental health by providing private, easily accessible online assistance. This study looks at how chatbot technology can help reduce mental stress and promote emotional well-being through digital conversations.

Mr Romit Vinod Kankaria and Dr Aman Agrawal (et al, 2021)[2] in their research title "An interactive chatbot for stress relief using Deep Learning and Natural Language Processing," a research project published in West Bengal, focuses on creating a conversation system that helps users manage stress with supportive and smart interactions. The goal of this project is to develop a system that enables people to speak with a loved one's recognisable voice even when they are not there. It seeks to guarantee safety and stop voice imitation abuse while offering individualised, real-time emotional support. The system responds in a reassuring, familiar voice after recognising the user's emotions. Testing revealed that responses were generated fast, and the recreated voice was very similar. The project shows how, in situations where direct contact is not feasible, technology can provide safe, meaningful, and emotionally supportive interactions.

Dr Shruti Patil, Dr Sheetal Kusal (et al.) (2024)[3] in their research title "Conversational AI for Mental Health Support" by Shruti Patil, Sheetal Kusal (et al.) explores how conversational AI technologies can improve mental health care by providing individualised guidance, early symptom detection, and accessible support. By identifying early indicators of distress and offering guidance for stress and anxiety, conversational AI provides round-the-clock access to mental health support. Using LSTM and BERT models trained on Mental Health Conversation data from Kaggle, the reviewed article details the creation of a chatbot. Even though these technologies have the potential to revolutionise mental health care through tailored and flexible interactions, they shouldn't take the place of current clinical procedures, particularly when it comes to conditions like brain injury. Rather, AI tools should support professionals by providing information, support, and encouragement in addition to conventional therapy.

Dr Sourav Banerjee, Dr Ayushi Agarwal, Ms Promila Ghosh, and Ayush Kumar Bar(2024)[4] in their article "Boosting Workplace Well-Being: A Novel Approach with a Mental Health Chatbot for Employee Engagement and Satisfaction "examine that AI-driven mental health interventions, like chatbots, are becoming more significant in addressing workplace mental health issues, according to existing literature. Although there is still a lack of practical knowledge and adoption, studies show that HR professionals are highly aware of these tools. AI platforms' anonymity encourages workers to get help for delicate mental health issues. Additionally, research shows that although many organisations provide mental health programs, their efficacy and accessibility are frequently questioned. Nonetheless, issues with data confidentiality and privacy continue to exist. It emphasises the need for organisational acceptance and ethical safeguards while supporting the potential of AI interventions.

Ms Aakriti Saini, Dr Ashish Chandra, Dr Shobhit Agrawal, and Mr Maheshbhai Kansara (2024)[5] in their article "Chatbots Usage in Online Customer Service", show that chatbots are being used more frequently in B2C e-commerce to improve online shopping and customer support. Research demonstrates how AI-powered chatbots can provide efficient and customised interactions. Models like the Theory-Context-Characteristics -Methodology (TCCM) framework are frequently used in research on chatbot adoption to comprehend user experience. High-quality research is still in its infancy, though. Research gaps are further revealed by conversational agents' rapid advancements. In general, the literature highlights the need for more study to maximise the use of chatbots in online marketplaces.

3. STATEMENT OF THE PROBLEM

Due to their heavy workloads and frequent interactions with customers, customer service representatives frequently experience high levels of stress. Chatbots are being used by organisations more frequently to lessen this burden, but there is still little data on their effectiveness. This study compares the stress levels of employees before and after chatbots are implemented. Additionally, it evaluates whether chatbot assistance enhances workers' job satisfaction and mental well-being. The study examines how consumer acceptance of chatbots affects employee stress levels using data from 100 customer service representatives.

4. OBJECTIVES OF THE STUDY

- ✓ To explore how chatbots can reduce workload and stress for customer service workers.
- ✓ To determine customer satisfaction levels when using chatbot support versus a human-only service.
- ✓ To examine how customer trust in chatbot responses affects service pressure and how cost-effective chatbots are at reducing stress-related inefficiencies.

5. RESEARCH METHODOLOGY

Research Design

The research employs a descriptive research design to investigate how chatbots alleviate customer service stress. It examines users' views and experiences without altering any variables. The study relies on primary data gathered via a structured questionnaire, complemented by secondary sources.

Research Approach

The research utilises a quantitative research method to examine the impact of chatbots on alleviating customer service stress.

Area of the study

The research takes place in Coimbatore city, Tamil Nadu, an evolving urban locale with extensive adoption of digital customer service technologies. The city's combination of residential, commercial, and service areas offers a varied respondent pool.

Sample Size and Sampling Technique

- Sample Size

The research is founded on a sample size of 70 participants who have utilised chatbot-driven customer support.

- Sample Technique

The research utilises a convenience sampling method to choose participants who are readily available and eager to take part.

Sources of Data

Both primary and secondary data were used in the study. Using Google Forms to gather primary data from respondents. The secondary data was collected from Journals, Books, Research articles, reports, and internet sources.

Statistical tools used:

- Percentages and frequencies
- Chi-square test
- Average Score

Period of the study

The study uses primary data to collect information from respondents, which took place between November 2025 and January 2026.

6. DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of data gathered from 70 customer service representatives, who were analysed utilising quantitative techniques. Descriptive statistics were employed to summarise levels of stress and perceptions. Inferential methods like percentage analysis, average score, and Chi-square test were used to analyse differences and connections between variables. The evaluation measured stress levels prior to and following chatbot deployment. It examined how customer acceptance and chatbot use affect workers' stress levels and job satisfaction.

PERCENTAGE ANALYSIS

Table No: 6.1 Personal profiles of the respondents

Personal Profile	Particulars	No of Respondents	Percentage
Gender	Male	32	45.71
	Female	38	54.29

Age	Below 25	45	64.28
	25-35	11	15.71
	36-45	8	11.42
	46-55	2	2.85
	Above 55	4	5.71
Educational Qualification	Student	9	12.85
	Undergraduate	34	48.57
	Postgraduate	8	11.42
	Others	19	27.14
Occupation	Student	48	68.57
	Employed	19	27.14
	Self-Employed	0	0
	Homemaker	0	0
	Others	3	4.28
Monthly Income	Below Rs.50,000	28	40.00
	Rs.50,000 - 70,000	5	7.14
	Rs.70,000 – 1,00,000	2	2.85
	Above Rs.1,00,000	1	1.42
	No Income	34	48.57
Area	Rural	42	60.00
	Urban	28	40.00

Source: Primary Data

INTERPRETATION

TABLE 6.1 shows the personal profile of the respondents. According to the survey, women participated at a slightly higher rate (54.29%) than men (45.71%), and the majority of respondents (64.28%) were under 25. The sample is dominated by young people, as evidenced by the high percentage of respondents who are students (68.57%) and undergraduates (48.57%). Forty per cent of the respondents make less than Rs. 50,000 a month, and nearly half (48.57%) have no income. 60% of respondents are from rural areas, indicating a greater representation of rural areas in the study.

Table No 6.2: Chatbot usersanalysis/satisfaction of the respondents

Particulars	Categories	No. of Respondents	Percentage
Frequency of chatbot usage	Frequently	32	45.71
	Occasionally	27	38.58
	Rarely	11	15.71
Stress level effectiveness after chatbot usage	Very effective	13	18.57
	Effective	32	45.71
	Moderate effective	19	27.14
	Slightly effective	3	4.29
	Not effective	3	4.29

Factors that increase your trust in chatbot responses	Accurate information	11	15.71
	Quick response time	47	67.14
	Consistent answers	4	5.71
	Easy-to-understand language	3	4.29
	Secure and private interaction	5	7.15
For quick problem resolution, which service is more efficient	Chatbot support(AI)	21	30.00
	Human customer service	8	11.43
	Both	41	58.57
Satisfaction with chatbot support	Satisfied	53	75.71
	Neutral	15	21.43
	Dis-satisfied	2	2.86

INTERPRETATION

TABLE 6.2 shows Chatbot user analysis/satisfaction of the respondents indicates a high overall usage of chatbots, with 45.71% of respondents using them frequently and 38.58% using them occasionally. 18.57% rated chatbot usage as very effective, and 45.71% found it effective in reducing stress, indicating a positive effect on user well-being. Quick response time (67.14%) is the primary factor influencing trust in chatbot responses, followed by accurate information (15.71%). While 30% favoured chatbot support alone, the majority (58.57) preferred a combination of chatbot and human support for speedy problem resolution. With 75.71% of respondents satisfied with chatbot support, overall satisfaction is high, indicating strong user acceptance.

AVERAGE SCORE

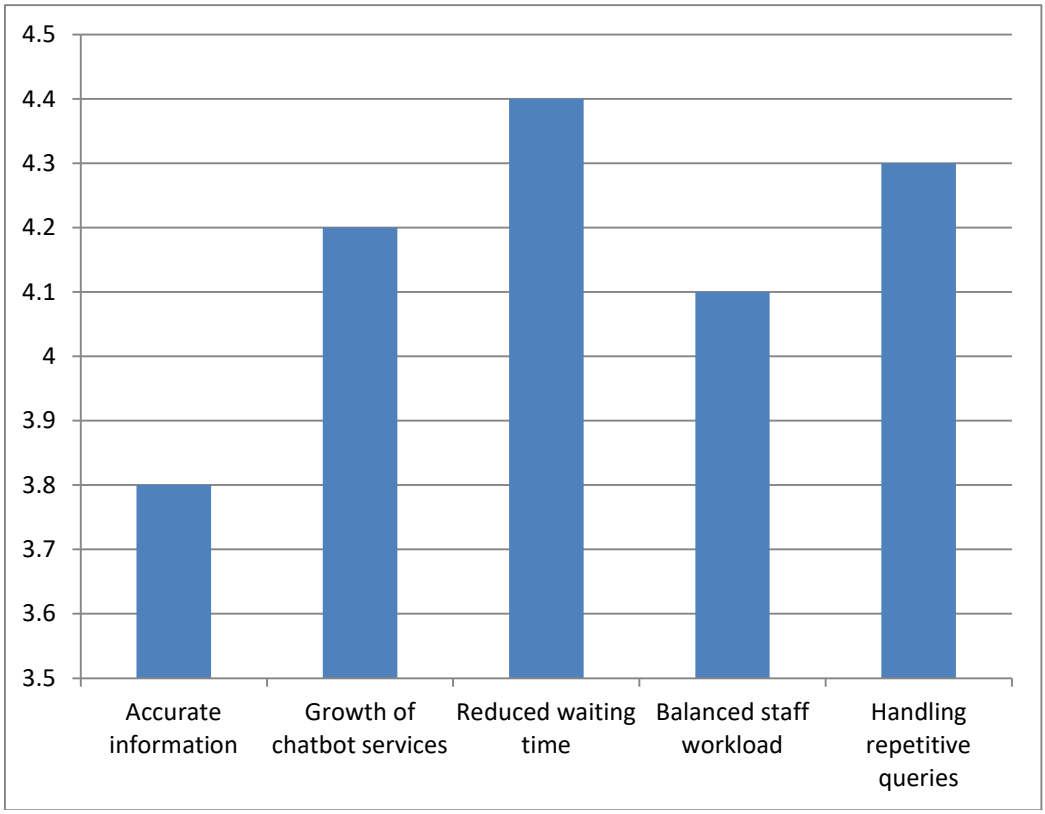
Table No: 6.3 Customer perceptions

S.NO	STATEMENT	AVERAGE SCORE
1	Trustinn chatbots provide accurate information.	3.8
2	Chatbot services have increased over time.	4.2
3	Chatbots help to reduce long waiting times for customers.	4.4
4	Chatbots contribute to a more balanced workload for customer service staff.	4.1
5	Chatbots help in handling repetitive customer queries effectively	4.3
Chatbot usage level	No. of respondents (n)	
Often	32	
Sometimes	27	
Rarely	11	
Total	70	
Mean Stress Score	23.33333333	
Standard Deviation (SD)	10.96965511	

Source: Gathered from Primary data

INTERPRETATION

Table 5.3 shows customer perceptions. The average score analysis shows that people have a favourable opinion of chatbot services, especially when it comes to handling repetitive queries and cutting down on waiting times. Additionally, respondents concur that chatbots have grown over time and aid in balancing the workload of employees. The majority of users show good adoption by using chatbots frequently or occasionally. With some variation among users, the mean stress score and standard deviation point to a moderate decrease in stress.



CHI-SQUARE TEST

Table No: 6.4 Analysis of Chi-Square Test

Cell	Basis	Observed Value	Expected value	$X^2 = (O-E)^2/E$
Male	Satisfied	26	27.00	0.037
	Neutral	6	5.50	0.045
	Dissatisfied	3	2.50	0.100
Female	Satisfied	28	27.00	0.037
	Neutral	5	5.50	0.045
	Dissatisfied	2	2.50	0.100

CHI-SQ TEST =

$$X^2 = \sum \frac{(O-E)^2}{E}$$

$$X^2 = 0.364$$

INTERPRETATION

The Chi-square test indicates that the computed value (0.364) is lower than the table value at a 5 per cent significance level. Therefore, the null hypothesis is accepted, suggesting that there is no meaningful connection

between gender and the level of customer satisfaction. Since **0.364 < 5.991**, the result **is no Significant Difference.**

7. FINDINGS

Percentage analysis:

The majority of responders were young, rural students, with 64.28% under 25 and 68.57% students. The use of chatbots was widespread, with 84.29 reporting frequent or infrequent use and 64.28% reporting effective or very effective stress reduction. Overall, 75.71% of respondents were satisfied, and trust and satisfaction were high, primarily due to quick response time (67.14%).

Average Score:

The average scores show that people have a favourable opinion of chatbots, with the highest agreement for handling repetitive queries (4.3) and cutting down on waiting times (4.4). The mean stress score (23.33 ± 10.97) indicates a moderate reduction in stress with some variation among users, and the majority of respondents (59 out of 70) use chatbots frequently or occasionally.

Chi –Square test:

The Chi-square test shows there is no significant relationship between gender and satisfaction with chatbot usage due to the extremely low chi-square value ($\chi^2 = 0.364$).

8. CONCLUSION

The study concludes that chatbots are crucial in reducing customer service pressure by effectively managing standard and repetitive inquiries. Although chatbots enhance workload handling and operational effectiveness, human assistance is crucial for complicated problems. Well-designed chatbots, consistent updates, and the integration of human and chatbot interactions can improve customer satisfaction, foster trust, and enhance employee well-being, positioning chatbots as a financially efficient support resource in contemporary customer service environments.

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