



## Usability of Chatbot

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### Abstract

**Background:** The use of chatbots has increased considerably in recent years. These are used in different areas and by a wide variety of users. Due to this fact, it is essential to incorporate usability in their development. **Aim:** Our objective is to identify the state of the art in chatbot usability and applied human-computer interaction techniques, to analyse how to evaluate chatbots usability. **Method:** A systematic mapping study has been conducted, searching the main scientific databases. The search retrieved 170 citations, and 19 articles were retained as primary studies. **Results:** The works were categorized according to four criteria: usability techniques, usability characteristics, research methods and type of chatbots. **Conclusions:** Chatbot usability is a very incipient field of research, where the published studies are mainly surveys, usability tests, and rather informal experimental studies. Hence, it becomes necessary to perform more formal experiments to measure user experience and exploit these results to provide usability-aware design guidelines..

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### 1. Introduction

Chatbots area unit computer programs with a matter or voice interface based mostly on natural language. they're specifically designed to create user interaction as natural as attainable and have received in depth attention from academe and business in recent years. Chatbots not solely change a quicker and a lot of natural thanks to access data however they're going to become a key think about the method of humanizing machines within the close to future. Usability is outlined because the degree to that a program is used to deliver the goods quantified objectives with effectiveness, efficiency, and satisfaction in a such context of use. Usability may be an important side in interactive software system systems so it's essential to include usability in chatbots, to boost user expertise. Chatbots area unit become pervasive and area unit utilized in several areas, like bookings of all types of services, to get medical recommendation and for on-line looking. The multiple uses and advantages of chatbots justify their sturdy growth in terms of users, satisfaction and saving resources. though the market remains getting down to form compared to the quantity of internet sites, the quantity of bots remains not giant. it's calculable that the market size can expand massively. several universities and industrial firms have place into use chatbots interacting with mature systems. At the industrial level, Facebook traveller already

has a lot of than three hundred, chatbots in use. This makes downloading and putting in new apps excess, and the use of smart phones permits for personalization prospects. Further, the use of chatbots will be a lot of efficient than human-assisted support. Some firm' area unit building chatbots severally e.g., Microsoft is promoting the plan of "conversation as a Platform" to support a selection of media, from Skype to search. Chatbots area unit not a rising idea. analysis on dialogue systems will be derived back to the 50s, wherever Alan M. Turing Alan Mathison Turing mathematician exhibit the question "can machines think?" Lately, the advances in natural language process have boosted the raise of several chatbot development frameworks. However, there are a unit presently few works that discuss the usability of chatbots in an integrated and formalized manner. The objectives of analysis area unit to spot the state of the art in chatbots usability and the applied Human-Computer Interaction (HCI) techniques by a Systematic Mapping Study (SMS) and to research the way to value the usability of chatbots. The contribution of this analysis may be an image of this state of usability in chatbots. For this purpose, gift a SMS wherever we tend to classify the categories of chatbots, the measured usability characteristics, the applied usability techniques and the analysis ways want to value chatbot usability. A chatbot is outlined as an AI-based worm that simulates human

conversations. they're conjointly referred to as digital assistants that perceive human capabilities. Bots interpret and method the user requests and provides prompt relevant answers. Bots will through voice in addition as text and might be deployed across websites, applications, and electronic messaging channels like Facebook traveller, Twitter or WhatsApp.

## 2 RESEARCH METHOD Workflow:

A chatbot's normal interaction flow is as follows: By sending a message or interacting with a chatbot via a user interface, a user initiates a discussion. To determine the user's intent, the chatbot use natural language processing (NLP) to examine the words and phrases in the message.

To find a pertinent response, the chatbot looks through its library of pre-programmed answers

The user interface is then used to return the response to the user.

After that, the user has the option to continue responding, and the procedure is repeated until the discussion is over.

The library provides all of the answers to the chatbot. There are two ways this library obtains the data:

**Prestored:** Certain chatbots have been trained to react to specific instructions and keywords. A set of rules would be implemented into this chatbot to match frequently asked client questions with pre-written answers. For instance, the chatbot may have a preprogrammed rule that matches the phrase "open" and replies with a message that details the business's opening hours if a consumer asks, "What are your opening hours?"

Thus, the data that may include the answers to future queries is pre-stored by the programmer. **Continuous Learning:** Certain chatbots utilise machine learning (ML) to learn from their user interactions. This allows them to gradually expand their knowledge base and produce better, more individualised experiences. These more intelligent chatbots can serve users in many innovative and beneficial ways. When a user says, "I'd like to see a movie tonight," for instance, the chatbot's conversational AI will interpret the user's intent and offer pertinent recommendations based on the user's location, tastes, and past movie-watching selections

## [3] PATTERN MATCHING

Bots utilize pattern matches to cluster the text and it produces an acceptable response from the purchasers. AI language could be a commonplace structured model of those patterns. A larva is ready to induce the correct answer within the connected pattern. The bots react to something relating it to the correlate patterns

## [4] NATURAL LANGUAGE PROCESSING: NLP plays a crucial

Tokenization	Process of breaking text in smaller units (tokens) , such as words or sentences.
Part of speech Tagging	Assigning grammatical categories (e.g. noun, verb) to words in a sentence.
Named Entity Recognition	Identifying and Classifying named entity (e.g. names, location, date) in text.

role in enabling chatbots to understand and generate human-like language, facilitating effective communication between users and machines.

## Key Concepts in NLP:

### Tokenization:

The process of dividing text into tokens, which are smaller pieces, usually words or phrases.

The goal of tokenisation is to make it possible for computers to process and comprehend human language. It is the first stage in many NLP activities.

For instance: Wording: "The quick brown fox jumps over the lazy dog." ["The", "quick", "brown", "fox", "jumps", "over", "the", "lazy", "dog"] are tokens.

### Part of speech Tagging:

Definition: The process of giving each word in a sentence a grammatical category (such as noun, verb, adjective, or adverb).

POS tagging offers useful background information for comprehending the structure and meaning of text.

Information extraction, machine translation, and syntactic analysis are among the tasks that require it.

### Named Entity Recognition:

The process of recognising and categorising named entities (such as names, places, dates, and organisations) in text is known as definition.

The goal of NER is to assist in the extraction of information from text, which is essential for activities such as text summarisation, question answering, and information retrieval.

For instance: Wording: "Apple CEO Tim Cook visited India on 10th November 2023." Named Entities: ["India", "Apple", "CEO", "Tim Cook", "November 10, 2023"]

#### **Sentimental Analysis:**

The process of identifying the attitude or emotional tone (positive, negative, or neutral) that is conveyed in a text. Sentiment analysis is frequently used to measure public opinion and brand sentiment in market research, customer feedback analysis, and social media monitoring.

For instance: "This movie was fantastic!" is the sentence. Feeling: Good. [4],[5]

#### **[5] TYPES OF CHATBOTS**

Chatbots method information to deliver fast responses to all or any styles of users requests with predefined rules and AI primarily based chatbots. There are two kinds of chatbots:

##### **Rule primarily based chatbots: -**

Rule primarily based chatbots follow the predefined ways throughout conversations. At every step throughout the spoken language, the user can get to choose from express choices that verify ensuing step within the spoken language.

##### **Key attributes: -**

1. These bots follow planned rules. therefore, it becomes straightforward to use the larva for easier eventualities.
2. Interactions with rule primarily based chatbots area unit extremely structured and area unit most applicable to client support functions.
3. Rule primarily based bots area unit ideally appropriate for respondent common queries suck as Associate in Nursing inquiry concerning business hours, delivery standing, or trailing details.

##### **Conversational chatbots :-**

Conversational chatbots are brought up as virtual assistants or digital assistants. they're way more interactive and personalised than rule based mostly chatbots. they're rising as colloquial banking trends as they converse with the users as in a very manner humans converse and communicate in real-life things. Conversational communication skills of the chatbot technology empower them to deliver what customers area unit trying to find.

##### **Key attributes: -**

1. Conversational bots will perceive the context and intent of advanced conversations and check out to produce additional relevant answers.

2. AI bots apply prognosticative intelligence and sentiment analysis to know client emotions closely.
3. Machine learning bots learn from user behaviour and supply additional personalised conversations.[1]

#### **[6] USABILITY OF CHATBOT**

Participants in the experimental intervention (AIChatGPT intervention) will also be asked to fill out a survey regarding their perception of using generative AI as an assistance tool to complete their assignments. This survey aims to gather insights into their thoughts, opinions, and attitudes toward using AI in their learning experiences. Participants will have the opportunity to share their feedback on the effectiveness, benefits, challenges, and overall satisfaction while using AI for assignment completion. Their responses will provide valuable information on AI technology's perceived value and acceptance in enhancing their learning experience. Participants in the control intervention (conventional tools) will complete the same survey, but regarding the usability of the conventional tools.

The System Usability Scale (SUS) will assess the participants' perceptions of usability. The SUS is a valid questionnaire and will be administered at the end of the interventions and when participants cross over to the other assistance tool (AI-ChatGPT or conventional webbased tools without AI). The SUS is commonly used in numerous studies to assess the effectiveness and usability of new technologies, including in the education field. A recent systematic review of home-based telerehabilitation software systems for remote supervision revealed that the SUS tool was the most frequently used measure or tool across the studies examined. This scale has been translated into several languages, including the American Sign Language. The SUS questionnaire was originally developed as a "quick and dirty" tool, with the goal of providing a fast and nonintrusive assessment experience for participants. The SUS consists of 10 items formulated as affirmative statements, for which users indicate their level of agreement or disagreement on a 5-point Likert scale (1=strongly disagree; 5=strongly agree). For the odd answers (1, 3, and 5), we will subtract 1 from the score that the user answered; for the even answers (2 and 4), the score will be subtracted from 5. The values of the 10 questions will be added and multiplied by 2.5. The final score can range from 0 to 100. Internal consistency will be calculated using Cronbach  $\alpha$  per item and overall. This scale allows for the assessment of outcomes and comparisons within and between the 2 interventions (Table 1).

## [7] CONCLUSION

The advantage of having a reliable scale to test people's perception of the quality of interaction with conversational agents is that such a tool may enable (1) potential end-users to express their level of satisfaction in a consistent and replicable way, (ii) designers and evaluators to develop benchmarks to compare their results by modelling the different end-users and their need during the formative and summative phase of product assessment. Currently, BOT-Check could be considered a ready to use During the testing as part of the exploratory analysis of the BUS, some tools were closed for proprietary reasons or suspended due to COVID-19. e.g. <https://www.ato.gov.au/>. This was not an issue, as we were able to collect data to perform the analysis; however, it is representative of the volatile nature of the market for CRM chatbots. The threats to the validity of the present study should also be considered before using BUS-15. As we stated earlier, a more diverse range of people (age, gender and ability) are needed to use the system in future iterations; in this study mainly young participants with age below 35 years old were involved in focus groups and in the pilot of the scale. A more systematic analysis of people should be performed in future works to capture the perspective of different potential end-users better. Concurrently, as we reported above, the present version of the construct did not include the perspective of people with disabilities, and future research and evaluations should plan for this. Despite the limitations, the present work provides a new list of attributes specifically developed to measure satisfaction with CRM chatbots and a preliminary tool for assessment. We invite practitioners and researchers who want to contribute to the development of this tool to use BUS, together with other tools, to get insights about the needs and the point of view of end-users about the interaction with a chatbot. Conversational agents are creating an interactional paradigm shift and a range of new research and design opportunities in the field of HCI [27]; nevertheless, the quality of interaction with these tools can only be ensured by defining reliable criteria and assessment tools that can ensure comparability and support a satisfactory exchange between people and this evolving type of intelligent technology.[3]

diagnostic tool to control how much a chatbot interacts with people in line with guidelines and principles of quality design for conversational agents e.g. heuristic inspection. Conversely, BUS-15 currently cannot be used as an off-the-shelf product for user research and usability tests. Although we included a reasonable number of chatbots widely used by customers, further validation studies are needed with a larger number of chatbots and a diverse range of participants to ensure the reliability of the construct and to streamline the current version of BUS.

## [8] REFERENCE

- [1] USABILITY OF CHATBOTS - Siddhesh Satish Koyande.
- [2] Usability of Chatbots: A Systematic Mapping Study - Ranci Ren , John W. Castro , Silvia T. Acuña, Juan de Lara.
- [3] The Chatbot Usability Scale: the Design and Pilot of a Usability Scale for Interaction with AI-Based Conversational Agents - Simone Borsci, Alessio Malizia, Martin Schmettow, Frank van der Velde, Gunay Tariverdiyeva, Divyaa Balaji, Alan Chamberlain
- [4] How do chatbots work? – boost ai

- [5] Natural Language Processing in Chatbots: A Review - Bhupesh Patra Mahendra Kumar
- [6] Usability and Efficacy of Artificial Intelligence Chatbots (ChatGPT) for Health Sciences Students: Protocol for a Crossover Randomized Controlled Trial – Mirella Veras , Joseph-Omer Dyer , Morgan Rooney , Paulo Góberlânio Barros Silva , Derek Rutherford , Dahlia Kairy