

Human-Centric AI : Enhancing User Experience through Natural Language Interfaces

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Abstract

AI has significantly altered the way humans interact with technology. It is important to observe the impact of Natural Language Interfaces (NLIs) on user experiences in Human-Centric AI across various industries. Therefore, we specifically focus on the influence of Human-Centric AI and user interactions within AI chatbots in the United Arab Emirates (UAE). The aim of this study is to assess the factors that influence the acceptance of AI, examine its practical implications across different industries, and offer valuable insights for the responsible development of AI. A quantitative survey methodology was employed, involving 230 participants in the UAE. The research design, data collection, and analysis followed the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which emphasizes performance expectancy, effort expectancy, social influence, and facilitating conditions. The survey encompassed a variety of participants from various organizations, with a majority expressing positive attitudes towards AI chatbots. The survey found that 80% of users agreed that AI systems improve task efficiency, 84% believe they help achieve goals, and 84% view them as practical. According to 75% of participants, the social impact is strongly influenced by AI chatbot system adoption. However, 80% understood the relevance of organizational infrastructure and favorable conditions. In particular, 72% of users stated that Natural Language Interfaces transform, indicating satisfactory user experiences. These features demonstrate the influence of Human-Centric AI adoption and its use in different organizations. Natural language interfaces play a critical role in improving human-centered AI user experiences, investigating theoretical issues and real-world applications, and providing guidance for the ethical use of AI.

Keywords: AI, Natural Language Interfaces (NLIs), Human-Centric AI, User Experiences, Responsible Development, Unified Theory of Acceptance and Use of Technology (UTAUT).

1 Introduction

Artificial Intelligence (AI) is a transformative force in the ever-changing world of technology, reshaping the way humans interact with machines and systems (Abushammala et al., 2022). The field of AI encompasses a range of technologies that are designed to simulate intelligent behavior. Over time, this field has evolved and led to the classification of different types of AI, each with specific functionalities (Tan, 2023).

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These fields include deep learning and machine learning techniques, as well as rule-based systems. By looking at the various levels of these AI kinds, it offers a thorough grasp of the technological underpinnings that allow the development of intelligent systems. (Wulff et al., 2023). The ability of Natural Language Interfaces (NLIs) to understand and interact with human language has made them an essential component in the creation of user-centric artificial intelligence. From chatbots and virtual assistants to more complex language models, NLI integration has sped up the development of many AI applications (Latifi, 2018). The conversational and user-friendly interfaces made possible by this combination have improved user experiences in a wide range of fields. This research not only explores the theoretical underpinnings of Human-Centric AI and NLIs, but it also looks at their potential applications in a variety of fields (Brunetti et al., 2022; Naren, T.V., et al., 2023).

The study of Human-Centric AI and its amplification through Natural Language Interfaces necessitates a comprehensive understanding of the technical intricacies, while simultaneously highlighting the profound societal ramifications (Walaa, S.I., 2024). It may increase our understanding of these technologies and their potential applications. This contribution is to actively participate in the ongoing discourse surrounding the appropriate advancement and use of artificial intelligence. The study underscores the imperative requirement to coordinate technological progressions with the fundamental requirements and experiences of individuals, as emphasized by Paul et al. (2022).

2 Literature Review

2.1 The Evolution of Artificial Intelligence

Artificial Intelligence (AI) has evolved since its inception, leading to the emergence of a multidimensional field with varied applications (Terho, 2018). Sarker et al. (2023) suggested a framework for understanding the various capabilities of artificial intelligence (AI) by categorizing it into rule-based systems, machine learning, and deep learning. This classification serves as a basis for investigating the technological principles that underpin intelligent systems.

2.2 Human-Centric AI and Natural Language Interfaces

Human-Centric AI has become prominent in the broad field of AI, emphasizing the importance of aligning technological advancements with human experiences (Siala & Wang, 2022). Natural Language Interfaces (NLIs), such as chatbots and virtual assistants, are central parts of this alignment. These NLIs facilitate smooth communication between humans and machines (Mumtaz et al., 2020). NLIs have become crucial in improving user experiences by offering intuitive and conversational interfaces.

2.3 Practical Implications across Different Industries

NLIs, or Natural Language Interfaces, have gone beyond theoretical frameworks and are now being applied in various industries for practical purposes. Some notable examples mentioned in the study by Shen et al. (2022). include healthcare, finance, manufacturing, and customer service. The real-world applications of combining Human-Centric AI with NLIs highlight the concrete advantages, including improved efficiency, accessibility, and overall user satisfaction.

2.4 Responsible Development and Ethical Considerations

It is crucial for individuals and organizations to prioritize responsible development practices and consider the ethical implications of their actions. Responsible development refers to the process of creating. With the continuous advancement of AI technologies, especially Human-Centric AI, there is an increasing demand for responsible development and ethical considerations (Díaz-Rodríguez et al., 2023). The literature highlights the significance of ensuring that technological advancements are in line with societal values and meet the needs of humanity. The importance of responsible AI development becomes increasingly crucial as AI applications become more integrated into different aspects of our daily lives.

The Importance of Study

The study's significance lies in its specific focus on Human-Centric AI and NLIs within the context of the United Arab Emirates (UAE). The research aims to gain insights into how users in the UAE perceive and interact with AI technologies, specifically focusing on Natural Language Interfaces, through conducting a quantitative survey. The contribution of the study goes beyond theoretical frameworks and also explores practical implications and societal considerations.

Aims

The main objective of this research is to thoroughly investigate the role of Natural Language Interfaces in Human-Centric AI and how they affect user experiences in the UAE. The specific objectives are as follows:

Objectives

- To evaluate the factors that influence the acceptance and usage of AI technologies, using the UTAUT as a framework.
- To examine the practical implications of Human-Centric AI and NLIs across various industries in the UAE.
- To offer insightful AI information about technologies in the UAE.

3 Methods

3.1 Research Design

This research used a quantitative survey methodology to explore the application of Natural Language Interfaces (NLI) by users across various organizations in the United Arab Emirates (UAE). The study is intended to improve understanding of individuals' usage of artificial intelligence (AI) tools and how they react towards natural language interaction (NLI). This method, particularly bases itself from a research conducted by Creswell and Hirose in 2019, this strategy tries to learn how people feel about NLI as a tool for human activity (Antrobus et al., 2018).

3.2 Data Collection

The use of a quantitative survey approach is driven by the need to acquire reliable information (Toyon, 2021). The United Arab Emirates was chosen as the study location because of its growing investment

and interest in artificial intelligence. The United Arab Emirates was selected for this study because it provides an excellent setting in which to examine the development of AI, particularly in the area of NLI. The survey method is a helpful tool for collecting data from a varied spectrum of consumers, considering issues such as regional technical improvements and cultural nuances. The poll questions use Likert scales to gauge respondents' perspectives on NLI's potential for widespread use in the United Arab Emirates.

3.3 Participants

After sending the survey to 250 AI users in May 2023, we got a very respectable 92% response rate (230 people). Table 1 shows demographic data on the study's participants, including gender, age, education, and employment.

Table 1: Details of respondents

Features	Specification	Numbers
Gender	Female	105
	Male	125
Age profiles	18-25	50
	26-35	75
	36-40	65
	41 and older	40
Education Status	Undergraduate	46
	Post graduate	170
	Post doctorate	14
Job status	Employed	215
	Unemployed	15

Survey Instrument

The survey gathers expert opinions on the adoption of NLI and represents the results by using a Likert scale. The following questions are designed to gather information about users' experiences, preferences, and values regarding the approval of the UAE NLI. The data was collected with informed consent throughout the study procedure in order to maintain the confidentiality of the participants. The evaluation focused on analyzing the benefits and significance of the five main types of AI chatbots applied in various organizations for different purposes shown in Table 2.

Table 2: Chat boots of the study

Chatbot Type	Application	Description
Customer Support Chatbots	Industries, Customer Service	Assist users in resolving queries and issues related to products or services. In education, used for student support services.
Educational Chatbots	Education	Designed for educational purposes, providing assistance with learning materials, tutoring, answering academic questions, and offering guidance on coursework.
HR Chatbots	Human Resources, Industries	Streamline HR processes by assisting employees with inquiries related to benefits, policies, and procedures. May also aid in recruitment processes.
Healthcare Chatbots	Healthcare, Industries	Assist with appointment scheduling, provide basic medical information, and offer support for mental health concerns in the healthcare industry.
Virtual Assistants	Various Industries	Versatile chatbots performing a wide range of tasks, including answering general questions and providing administrative support in education and other industries.

3.4 Data Analysis

The quantitative data was analyzed by using statistical methods to reveal UAE NLI adoption patterns and trends. This analysis help to identify NLI-specific elements impacting users' AI technology sentiments shown in Table 3.

Table 3: Study questionnaire

Dimension	Questions	Scale
Performance Expectancy	<p>Q1= I believe that using ChatGPT enhances the effectiveness and efficiency of tasks I perform.</p> <p>Q2= ChatGPT's ability to provide comprehensive and relevant responses positively impacts my perception of its utility.</p> <p>Q3= I find that ChatGPT helps me achieve my goals and tasks effectively.</p> <p>Q4= ChatGPT enhances my productivity and efficiency when performing tasks.</p> <p>Q5= I find ChatGPT's responses accurate and helpful.</p> <p>Q6= ChatGPT's proficiency in understanding and generating responses to inquiries is impressive.</p>	1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree
Effort Expectancy	<p>Q1= ChatGPT is easy to use, and I don't encounter significant obstacles when interacting with it.</p> <p>Q2= my previous experience with technology has made it easier for me to use ChatGPT effectively.</p> <p>Q3= I have access to the necessary resources and support to use ChatGPT without difficulty.</p> <p>Q4= ChatGPT is user-friendly and easy for me to use.</p> <p>Q5= my prior experience with technology makes it straightforward to interact with ChatGPT.</p>	
Social Influence	<p>Q1= the recommendations and endorsements of ChatGPT by others, such as friends or colleagues, influence my decision to use it.</p> <p>Q2= Positive social influence encourages me to perceive ChatGPT as a useful and user-friendly tool.</p> <p>Q3= Social influence has reduced my concerns about using ChatGPT.</p> <p>Q4= Recommendations from friends or colleagues influence my decision to use ChatGPT.</p> <p>Q5= Positive social recommendations make me more willing to use ChatGPT.</p>	
Facilitating Conditions	<p>Q1= the presence of an organizational and technological infrastructure facilitates my use of ChatGPT.</p> <p>Q2= the presence of supporting infrastructure makes using ChatGPT more convenient.</p> <p>Q3= ChatGPT's ability to simulate natural and conversational dialogue enhances my engagement with the system.</p> <p>Q4= the comprehensiveness of ChatGPT's responses makes it efficient for accessing information and assistance.</p>	
Overall Experience	<p>Q1= ChatGPT has improved my overall experience with technology.</p> <p>Q2= I find it convenient to communicate with AI systems using natural language.</p> <p>Q3= ChatGPT's potential to transform how I interact with AI technologies is significant.</p> <p>Q4= my interactions with ChatGPT have positively impacted my overall experience with technology.</p> <p>Q5= I believe that ChatGPT has the potential to transform the way I interact with AI technologies.</p> <p>Q6= I believe ChatGPT has the potential to transform how we interact with AI technology.</p> <p>Q7= ChatGPT's user-friendliness and efficiency make it a valuable tool in my daily tasks.</p>	

3.5 Framework

Unified Theory of Acceptance and Use of Technology (UTAUT) model was used to extract information from existing theories. UTAUT's performance expectancy, effort expectancy, social effect, and enabling variables govern UAE AI adoption research shown in table 4. This flexible paradigm, employed in academia and the real world, gives a holistic view of AI technology adoption and application, particularly NLI.

Table 4: Fundamental construct of UTAUT theory (Dwivedi et al., 2019).

Factors	Explanation
Performance Expectancy	Performance expectation is fundamental to the UTAUT model, which explains and predicts technological acceptance.
Facilitating Conditions	The UTAUT model's Facilitating Conditions measure how much people perceive an organizational and technological infrastructure that encourages technology use.
UTAUT Moderating Factors	Four moderators affect the link between the key aspects of the UTAUT model and user behaviors: gender, age, experience, openness, and previous experience.
Effort Expectancy	Work effort expectancy refers to a technology's perceived ease of use.
Social Influence	Previous chatbot study suggests that social impact may affect a user's chatbot use. For instance, positive social impact can reduce users' perception of chatbot risks and barriers and increase their opinion of their value and usability.

4 Results

The survey was conducted among 230 AI users in the United Arab Emirates (UAE), and the results revealed a diverse participant profile (Table 1). The majority of participants were male (54.35%), between the ages of 26 and 35 (32.61%). A significant number of participants were postgraduates (73.91%) and employed (93.48%).

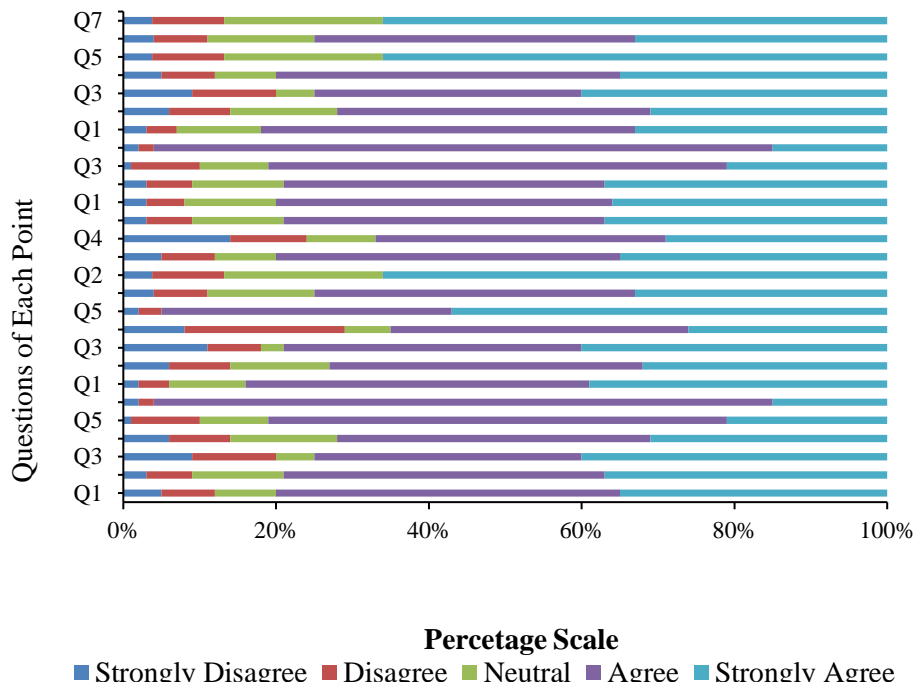


Figure 1: Likert analysis of data

4.1 Outline

Figure 1 provides an overview of the research findings, supporting with the Unified Theory of Acceptance and Use of Technology (UTAUT). This integration reflects the study's focus on understanding the intricate dynamics influencing individuals' acceptance and use of technology, with emphasis on emotional touch and intellectual engagement within the context of AI chatbots.

4.2 Performance Expectancy

4.2.1 Task Efficacy and Efficiency

Participants expressed a strong consensus (80%) on the belief that the AI chatbot significantly enhances the effectiveness and efficiency of their tasks. This underscores the practical and functional value of AI chatbots in improving productivity.

4.2.2 Comprehensive and Relevant Responses

A majority (79%) agreed that the AI chatbot provides complete and pertinent responses, positively influencing its perceived utility. This finding highlights the importance of the quality of AI chatbot responses in shaping user opinions.

4.2.3 Goal Attainment

A significant majority (84%) perceives the AI chatbot as effective in attaining goals and completing activities, aligning with the research's objective of enhancing task efficacy.

4.2.4 Productivity Enhancement

Approximately 72% of users believe that the AI chatbot has the capacity to boost productivity and efficiency in job execution, emphasizing its potential impact on time and resource management.

4.2.5 Accuracy and Usefulness of Responses

An overwhelming 81% of users view the responses generated by the AI chatbot as both accurate and useful, emphasizing the importance of providing high-quality responses for enhanced user satisfaction.

4.3 Effort Expectancy

4.3.1 Usability

A significant majority (84%) expressed a positive perception of the AI chatbot's usability, reporting minimal difficulties during interactions. This highlights the user-friendly nature of the AI chatbot, in line with the research focus on usability.

4.3.2 Role of Prior Technological Background

Approximately 73% of respondents considered their prior technological background as a catalyst for efficiently using the AI chatbot, indicating the influence of previous technology experiences on user interactions.

4.4 Social Influence

4.4.1 Recommendations and Endorsements

A substantial proportion (75%) acknowledged that suggestions and endorsements from friends and colleagues significantly influence their decision-making process regarding the use of the AI chatbot.

4.4.2 Perceived Value Due to Social Impact

A significant majority (82%) considers the AI chatbot as a valuable and easily navigable tool due to the presence of positive social impact, emphasizing the role of social recommendations in shaping user views.

4.5 Facilitating Conditions

Approximately 80% of participants agreed on the substantial impact of facilitating conditions, such as organizational architecture and technology systems, on their utilization of the AI chatbot. This underscores the criticality of a supportive infrastructure.

4.6 Overall Experience

4.6.1 Technological Experiences

User feedback indicates a highly favorable experience (82%) with the AI chatbot, contributing to enhanced technological landscapes, aligning with the study's objective of improving user experiences. The analysis of data were calculate shown in Figure 2.

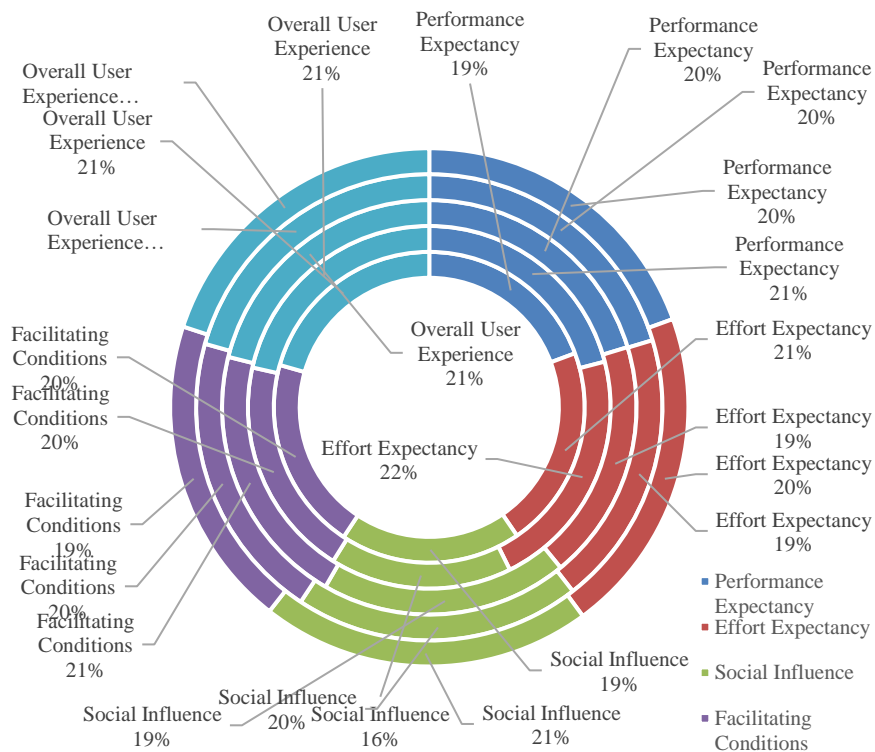


Figure 2: The analysis of data were calculate

4.6.2 Convenience of Natural Language Interaction

A majority of respondents (79%) acknowledged the convenience associated with using natural language to interact with AI systems, emphasizing the user-friendliness of the AI chatbot.

4.6.3 Potential to Revolutionize Interactions

A substantial majority (72%) believes that the AI chatbot has considerable potential to revolutionize interactions with AI technology, supporting the research's focus on exploring transformative capacities. Users perceive the technology as beneficial for improving work performance, user-friendly, and transformative, emphasizing the multi-faceted aspects influencing the adoption and utilization of AI chatbots. These results align with the research's primary goal of obtaining a comprehensive understanding of AI chatbot adoption and enhancing user experiences.

4.7 Sentiment Analysis of Different AI Chat Boot Used for Institutional Routine Work

The research results, which are presented in the summary table, highlight the benefits of AI chatbots in a variety of applications. Users of all chatbot types Virtual Assistants, HR, Education, Customer Support, and HR highly concur on the improvement of task efficacy and efficiency. It is clear that chatbots are easy to use; 73% to 84% of respondents find them to be very useful. Users' decisions are heavily influenced by social recommendations; 75% to 82% of users agree. An enabling infrastructure is considered essential, as agreed upon by 80% of chatbot kinds. Eighty-two percent of users say that their overall experiences with chatbots are consistently positive. The study emphasizes the adaptability and favorable acceptance of AI chatbots, highlighting their potential to improve a range of user interactions and task completion in sectors and education.

5 Discussion

The research was conducted in the United Arab Emirates (UAE) using a quantitative survey methodology. It focused on the adoption and user experiences of AI chatbots, specifically NLI. The study targeted to understand how consumers apply AI technology, focusing on user perceptions and behaviors. This approach is followed from the study approach conducted by Creswell and Hirose (Hayman & Smith, 2020). The practical significance of AI chatbots in enhancing task efficiency is shown by the overwhelming agreement of 80% of participants (Sidaoui et al., 2020). In addition, a significant proportion of participants (79%) acknowledged the AI chatbots ability to deliver thorough and pertinent responses, underscoring the significance of response quality (Dwivedi et al., 2021). The research's importance to Natural Language Interaction (NLI) is consistent with the perspectives of a significant majority (72%) of individuals who hold the belief that the AI chatbot has the potential to improve productivity. The significance of social influence has been recognized as a critical determinant, as a large percentage (75%) of persons stated that recommendations from friends and colleagues exert a substantial impact on their decision-making process about the use of the AI chatbot. The present findings align with other research on chatbots, indicating that societal acceptance is progressively influential in the uptake of technological innovations (Kavaz et al., 2023).

The research additionally revealed that a significant majority of AI chatbot users (82%) reported a positive experience and expressed satisfaction (84%) on the ease of its usage. The fact that 73% of respondents acknowledged that their prior technological background influences efficient use highlights the significance of user familiarity. According to 80% of participants, facilitating conditions, such as organizational infrastructure, were considered crucial. This highlights the importance of having a

supportive environment (Wright & Atkinson, 2019). The research contributes to the evolving landscape of AI adoption by providing insights into user preferences and challenges, specifically in the context of the UAE. These findings highlight the transformative potential of AI technologies, which aligns with global trends. They also emphasize the important role that societal influence plays in shaping user perceptions and decisions.

6 Conclusion

This study digs into Human-Centric AI, with an emphasis on Natural Language Interfaces' (NLIs) game-changing function in creating meaningful interactions between machines and people. The ramifications of this technological convergence on society, as well as their theoretical underpinnings and practical applications in a range of sectors, are investigated. Using the Unified Theory of Acceptance and Use of Technology (UTAUT), researchers in the United Arab Emirates sought to gain insight into how people there think about and interact with natural language understanding (NLI) systems.

The main findings are as follows:

- There is widespread agreement that AI technology may improve task effectiveness and efficiency, comprehensive replies, goal achievement, productivity, and accuracy, according to an evaluation of factors influencing AI technology acceptance conducted with UTAUT.
- Second, the real-world applications of NLIs in a variety of UAE-based businesses are discussed, illuminating the ways in which these tools improve productivity and client satisfaction.
- By highlighting the importance of societal values and responsible practices in the field of AI, the study concludes with useful insights for the responsible development and ethical usage of AI technologies.

In brief, this study adds to the current discussion on how to create AI systems that are both responsible and beneficial to their end users.

Conflict of Interest

The authors declare no conflict of interest, financial or otherwise.

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Declaration of Guidelines

All procedures performed in this research involving human participants were in accordance with the ethical standards of the 1975 Helsinki Declaration.

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Declared None.

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