Conversational Interfaces and the Challenges of Design and Development of Accessibility Requirements: A Report on Studies with the Older Public

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Abstract. Introduction: *Older adults often face difficulties using digital systems, sometimes depending on others for tasks or abandoning technology. In chatbot scenarios, these challenges relate to platform limitations, developers' prior knowledge, and users' skills. This study examines conversational systems from empirical research with older adults.* ***Methodology:*** *Chatbots were developed following accessibility guidelines and evaluated through tests with older participants.* ***Findings:*** *The results indicate the need to rethink software implementation and study approaches, paying attention to unreported participant attitudes. The insights obtained were key to refining the guidelines and advancing more accessible chatbot solutions for older users.*
Keywords *Accessibility, guidelines, older people.*

1. Introduction

Population aging is a global reality, increasing the demand for technologies that support older adults in maintaining independence and quality of life. Many seniors wish to age in their own homes, which drives the development of digital solutions such as connected healthcare, assistive robots, and conversational agents.

Chatbots are a promising alternative because they combine low-cost implementation, 24/7 availability, and the familiarity of messaging apps, which are widely adopted by older users. However, age-related limitations—such as vision, hearing, and motor impairments—require accessible and inclusive designs.

Despite advances in Human-Computer Interaction (HCI), our previous systematic review revealed that chatbot accessibility for older adults remains underexplored, and designers often overlook basic usability aspects when implementing conversational agents. Developers outside HCI fields may lack guidance, resulting in chatbots that fail to support elderly users effectively.

To address this gap, our research proposes and evaluates guidelines for accessible chatbot development, aiming to:

1. Support designers and developers, including those without HCI background;
2. Promote inclusive interactions for elderly users;

3. Bridge the gap between academic knowledge and practical chatbot implementation.

This paper reports an empirical study with elderly participants interacting with two chatbots developed using our guidelines. The results contribute to refining the guidelines and highlight essential design considerations to improve accessibility and user experience for older adults.

2. Related Works

Older adults often wish to age at home and benefit from assistive technologies. [Martinez-Martin e del Pobil 2018] explored robotic solutions that help with daily activities, such as taking medication or summoning help. [Etemad-Sajadi e Gomes Dos Santos 2019] studied seniors' acceptance of connected healthcare models, highlighting the importance of social presence for adoption.

In chatbot research, [Følstad et al. 2018] identified factors influencing users' trust in chatbots, including human-likeness, self-presentation, and privacy. [Petäjävaara 2022] showed that a "humble" chatbot style improves credibility. [Silva e Canedo 2022] proposed guidelines for conversational design, validated by practitioners.

Accessibility remains underexplored. [Torres et al. 2019] found that few studies address chatbots for blind users, and works such as [Valério et al. 2020, Valtolina e Marchionna 2021] show the need for careful conversational design for engagement with elderly users.

3. Guidelines for Accessible Chatbot Development

We proposed guidelines through an iterative process with elderly users and developers. Some examples are summarized in Table 1.

Tabela 1. Example of the guidelines.

Name	Area	Criticality	Key Recommendation
Design support framework	Design	High	Use frameworks like PLuRaL to align design with target audience
Voice commands	Design	Low	If implemented, add synonyms to cover language variation
Emojis	Design	High	Place emojis at the end to support screen readers
Conversation	Design	High	Begin with a short description of chatbot purpose

4. Methodology

Eight seniors (64–74 years; 5F, 3M) from a smartphone literacy course participated. After consent, each interacted with one of two chatbots:

- Chatbot 1: messaging app bot for product recommendations.
  Example: "Type online for online purchases or nearby for local recommendations."

- Chatbot 2: quiz bot for smartphone training tasks.
  Example: "Is the Great Wall visible from space? → No, not without aid."

Each participant interacted for about 5 minutes; semi-structured interviews followed.

5. Findings and Discussion

Four main themes emerged:

1. Voice interaction preference – Half the participants preferred voice due to speed or visual limitations. Chatbots must clearly signal audio options.
2. Chatbot identity – Lack of a "face" or name generated discomfort; seniors appreciate a friendly "virtual companion."
3. Answer length – Long texts or URLs discouraged reading; concise replies with "learn more" links are recommended.
4. Virtual friend behavior – Some participants said they would use the chatbot as a search tool, highlighting potential for companionship.

Additional insights include the need for:

- Clear conversation flow (bot should initiate/farewell);
- Shortened links for small screens;
- Explicit instructions or intuitive UI for voice input.

6. Final Remarks

The study validated our guidelines with real users, revealing gaps: even "obvious" usability points must be explicit for non-HCI developers. Seniors enjoyed the experience but faced challenges in voice use, navigation, and message length.

Limitations include the small sample and participants' prior digital literacy. Future work will refine guidelines, release them publicly, and test new chatbots with a broader elderly audience.

7. Ethical Considerations

This study was approved by the University of São Paulo ethics committee (CAAE 83667524.2.0000.5464). Participation was voluntary, anonymized, and followed research integrity standards.

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The authors clarify that ChatGPT was used in this work for grammatical correction and improvements in the text of the introduction, as well as the Grammarly tool and the Google Chrome Language Tool plugin for grammatical corrections.

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