

# Design Recommendations for Chatbots Supporting People with Depression

-Presented By SUBHAKAR GUDIVADA

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# OBJECTIVES

- ▶ Abstract
- ▶ Population targeted
- ▶ Literature Background
- ▶ Goal of study and research questions asked
- ▶ Research methods used
- ▶ Conclusion

# Abstract

- ▶ The study aims to compare and evaluate different chatbots for depression and provide design recommendations for chatbots to support people with depression. The study uses a benchmarking approach to evaluate 16 chatbots designed to provide support for individuals with depression. The researchers analyze the chatbots' features and conduct three discussion sessions with mental healthcare experts and an HCI expert to evaluate the chatbots' design and provide recommendations.

# Literature Background:

- ▶ Depression is a common mental disorder that affects millions of people worldwide. While conventional drugs and clinical treatments are available, computational solutions such as chatbots have emerged as a promising approach to support people with depression.
- ▶ Previous studies have demonstrated the potential of chatbots in supporting individuals with depression. Fitzpatrick et al. (2017) found that a chatbot-based intervention improved depression scores and reduced suicidal thoughts in college students. Ernala et al. (2017) showed that a chatbot-based intervention was effective in reducing depression and anxiety symptoms in a group of adults with mental health issues.

# Population Targeted:

- ▶ The paper focuses on individuals diagnosed with depression and aims to develop design recommendations for chatbots that can provide therapeutic support to this population.

# Research Questions

1. What are the existing chatbots for people with depression?
2. What are the key design elements that should be included in chatbots for people with depression?
3. How can chatbots be personalized to better support individuals with depression?

# Different existing chatbots

IHC '22, October 17–21, 2022, Diamantina, Brazil

Souza, et al.

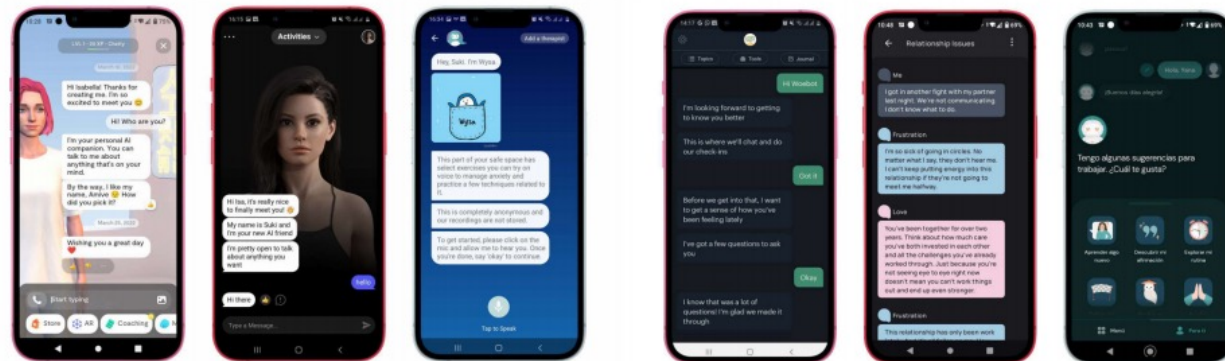


Figure 2: Chatbots user interfaces. From left to right: Replika, Anima, Wysa, Woebot, Antar and Yana.

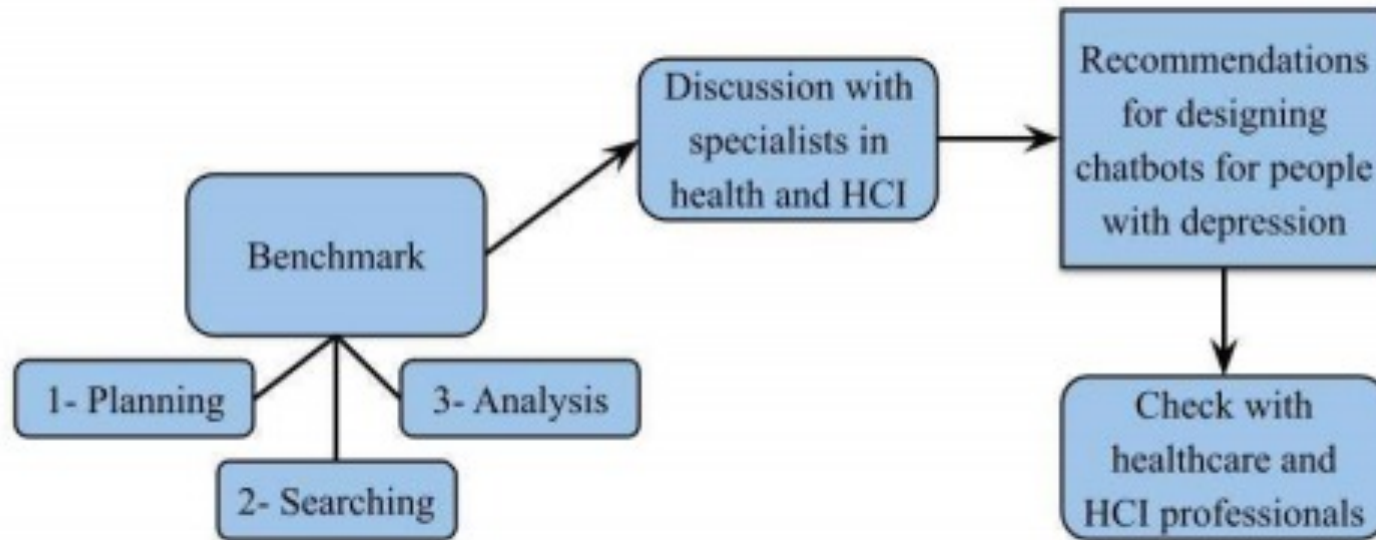
Table 1: Benchmark results - technical features.



# Key Aspects of the Research Design:

- ▶ Research Design: Benchmarking approach.
- ▶ Sample Size: 16 chatbots were evaluated.
- ▶ Data Collection: Analysis of chatbots' features, discussion sessions with experts.

# Key Aspects of the Research Design:



# Phases of Benchmark Approach

- ▶ **Planning:** The authors first established the research questions and objectives for the study, which included selecting and comparing chatbots for depression, presenting the results to healthcare specialists for assessment, formalizing design recommendations, and checking these recommendations with mental healthcare and HCI professionals.
- ▶ **Searching:** The authors conducted a comprehensive literature review to identify existing chatbots for depression that were publicly available and had a therapeutic focus. The search was performed using online databases and search engines, and the resulting chatbots were evaluated based on specific criteria.

# Phases of Benchmark Approach

- ▶ Analysis: The selected chatbots were evaluated based on specific criteria such as their ability to provide emotional support, their ability to engage with users, and their ease of use. The evaluation was conducted using a standardized assessment form that included both qualitative and quantitative measures. The evaluation results were then presented to healthcare specialists for assessment, and the specialists provided feedback on the chatbots' design, functionality, and potential therapeutic impact. Finally, the authors formalized design recommendations based on the evaluation results and feedback from the specialists, and these recommendations were checked with mental healthcare and HCI professionals to ensure their adequacy.

# Technical features analysis

**Table 1: Benchmark results - technical features.**

	<b>Replika</b>	<b>Anima</b>	<b>Wysa</b>	<b>iFriend</b>	<b>Woebot</b>	<b>Antar</b>	<b>Yana</b>
<b>Developer</b>	Luka, Inc	Aperry Ltd	Touchkin	Novi Limited	Woebot Health	Antar App	YANA APP S.A.P.I. de C.V.
<b>Category</b>	Health and Fitness	Entertainment	Health and Fitness	RPG	Medical	Productivity	Health and Fitness
<b>Content Ratings</b>	14+	14+	All Ages	14+	All Ages	All Ages	All Ages
<b>Number of Downloads</b>	>500000	>100000	>1000000	10000	100000	10000	>5000000
<b>Number of Reviews</b>	385935	10875	113696	14311	11398	396	92277
<b>Score</b>	4.1	4.3	4.9	4.1	4.4	5.0	4.5
<b>System Requirements</b>	Android 8 or higher / iOS 13 or higher	Android 8 or higher / iOS 13 or higher	Android 4.1 or higher	Android 6 or higher / iOS 11 or higher	Android 6 or higher / iOS 13 or higher	Android 6 or higher / iOS 13 or higher	Android 5 or higher / iOS 11 or higher
<b>Place of Development</b>	USA	Not Available	India	Chipre	USA	Not Available	Mexico

# Interaction and usability aspects analysis

**Table 2: Benchmark results - interaction and usability aspects**

	Replika	Anima	Wysa	Woebot	Antar	Yana
<b>Language</b>	English	English	English	English	English, Chinese, Hindi, Spanish	Spanish
<b>Interaction Format (text, voice, IR)</b>	Text, Voice, AR	Text	Text, Voice	Text	Text	Text
<b>Communication Format (closed or open-ended questions, voice, etc)</b>	Open-ended Questions, Voice, Images	Open-ended Questions	Closed and Open-ended Questions	Closed and Open-ended Questions	Open-ended Questions	Closed and Open-ended Questions
<b>Graphical Representation (avatar)</b>	User Customized 3D Avatar	User Customized 3D Avatar	2D system mascot (Drawing of a penguin aligned with the App's visual identity)	2D system mascot (Drawing of a robot aligned with the App's visual identity)	N/A	2D system mascot (Drawing of a robot aligned with the App's visual identity)
<b>Speech Pattern (syntax, semantics, pragmatic)</b>	Casual and friendly	Semi-formal e friendly	Casual e friendly. Constant use of emojis and slangs.	Casual and friendly	Defined by the user, when creating a persona.	Casual and friendly
<b>Personalization</b>	Preferred pronouns, alias, date of birth. / Customization of the bot's "personality" and appearance, and chat background.	Preferred Pronoun and Alias. / Customization of the bot's "personality" and appearance, and chat background.	Alias. / Referral codes. / Setting focus points/goals (stress, loneliness, grief). / Self-Care or Guided Support. options	Alias. / Choice of check-in time.	Creation of Personas.	Alias. / Specially recommended therapeutic exercises.
<b>Origin in Research</b>	N/A	N/A	Yes	Yes	N/A	N/A
<b>In-App Shopping</b>	Yes	Yes	Yes	No	No	Yes
<b>Privacy and Security</b>	Login and Password	PIN code	PIN code	BioLock	Offline data storage, BioLock, PIN Code	N/A
<b>Support Features</b>	Gamification	Games. / Relaxing Activities.	Selfcare (Premium). / My Journey. / Therapeutic Exercises. / Get access to a Therapist.	Mood Tracker. / Gratitude Journal.	Custom Chat session with Personas (Inner Voices/ Emotions)	Therapeutic Exercises. / Symptoms Evaluation. / Journaling.

# Design Recommendations

1. Use a conversational and empathetic tone: Chatbots should use a conversational and empathetic tone that is non-judgmental and supportive. They should avoid being overly formal or clinical, and instead use language that is warm and friendly.
2. Provide positive reinforcement: Chatbots should provide positive reinforcement to users, such as congratulating them on completing a task or acknowledging their progress.
3. Personalize the chatbot's responses: Chatbots should be designed to personalize their responses to users, such as using the user's name or referencing their previous interactions with the chatbot.
4. Include self-help resources: Chatbots should include self-help resources, such as links to articles or videos that provide additional information on depression and self-care strategies.
5. Allow users to express their feelings: Chatbots should provide users with the opportunity to express their feelings and emotions in a safe and non-judgmental environment.

# Design Recommendations

Design Recommendations for Chatbots to Support People with Depression

IHC '22, October 17–21, 2022, Diamantina, Brazil

**Table 3: Design recommendations for chatbots to support people with depression.**

Depression oriented design recommendations	Crisis management	1. Allow the user to indicate persons of reference who should be contacted in the event of a crisis. 2. Provide shortcuts so that persons of reference are quickly reached out to in case of a crisis. 3. Offer information for human specialized care, preferably free or low-cost.
	Determinants and interventions	4. Go beyond the symptoms. Identify the determinants of suffering. 5. Check which protective factors have already been tried. 6. Intervention proposals must cover self-oriented but also psychosocial solutions, at different levels of care.
	Feeling	7. Provide interaction options for uncertain subjective feeling. 8. Do not add pressure on the user.
General mental health design recommendations	Interface elements	9. Use emojis. 10. Use icons. 11. Inform the estimated time for the dialogue.
	Speech pattern	12. Adopt lightness in the dialogue. 13. Adopt empathy strategies.
	Personalization	14. Offer options to personalize the chatbot. 15. Offer options for user naming and reference. 16. Offer options to pause and restart the conversation.
	Feedback	17. Ask for explicit feedback regarding the user's mental health. 18. Ask for explicit feedback regarding the interaction. 19. Inform the user about any data collection, storage and use.
	Acessibility	20. Go beyond physical impairments. Consider economic, language and literacy differences. 21. Design for interaction without internet connection.
	Privacy	22. Design for non-embarrassed, non-identifiable alert messages. 23. Offer login with password.
	Security	24. Adopt security technologies to avoid undesirable access to personal health data.



# Key Aspects of the Research Methods:

- ▶ The authors used a benchmarking approach to identify and compare existing chatbots for people with depression.
- ▶ They also conducted three discussion sessions with experts in mental healthcare and HCI to gain insights into the key design elements that should be included in chatbots for people with depression.
- ▶ Finally, the authors conducted an online survey to validate their design recommendations.

# Strengths of the Methods Used:

- ▶ The study employed a comprehensive benchmarking process to select and compare chatbots for depression, which was based on multiple criteria such as effectiveness, user engagement, personalization, and ethical considerations.
- ▶ The study involved expert input from mental healthcare and HCI professionals to validate and refine the design recommendations for chatbots for people with depression.
- ▶ The study provided a set of 24 design recommendations for chatbots for depression, which can serve as a guide for future research and development.

# Weaknesses of the Methods Used:

- ▶ The study relied on existing chatbots that were commercially available, which may not represent the full spectrum of possible design solutions for chatbots for depression.
- ▶ The study did not involve end-users in the design and evaluation process, which may limit the relevance and usability of the design recommendations in real-world settings.
- ▶ The study did not provide a detailed evaluation of the effectiveness of the selected chatbots or the impact of the design recommendations on users' mental health outcomes.

# Major Findings:

- ▶ The study identified 24 design recommendations for chatbots for people with depression, which were grouped into the following categories:
- ▶ User interface elements (e.g., visual design, navigation, feedback)
- ▶ Conversation styles (e.g., empathy, active listening, positive reinforcement)
- ▶ Personalization features (e.g., tailoring to user preferences, adapting to user mood)
- ▶ Ethical considerations (e.g., privacy, transparency, ethical guidelines)

# Discussion Points

- ▶ The study has significant implications for the design and implementation of chatbots for individuals with depression. By presenting a list of 24 design recommendations, this study offers a valuable guide for designers and developers to create more effective and personalized chatbot interventions. It highlights the importance of user-centered design and emphasizes the need for chatbots to be sensitive to the unique needs of individuals with depression.

# Discussion Points

- ▶ Moreover, this study also highlights the need for ongoing evaluation and testing of chatbot interventions for individuals with depression. Although chatbots have shown promise in assisting with depression treatment, the effectiveness of these interventions can vary depending on factors such as user engagement and personalization. Thus, continued research is needed to identify the most effective design features and implementation strategies for chatbot interventions for depression.

# Conclusion

- ▶ Overall, I found this paper to be a well-conducted study that provides valuable insights into the design and implementation of chatbot interventions for individuals with depression. The study is rigorous in its methodology, and the use of expert input adds validity to the design recommendations presented.
- ▶ The study's findings are highly relevant to the current landscape of mental health treatment, where digital interventions are becoming increasingly popular. By providing a set of evidence-based recommendations, this study can inform the development of more effective and personalized chatbot interventions for individuals with depression.

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# Personal Thoughts/Reflections:

- ▶ One potential limitation of the study is that it primarily focuses on the design of chatbots and does not extensively evaluate their effectiveness in treating depression. While the design recommendations are undoubtedly important, further research is needed to determine the effectiveness of chatbot interventions for depression and how these design features impact treatment outcomes.

# Personal Thoughts/Reflections:

- ▶ While chatbots can provide therapeutic support for people with depression, it is important to note that they should not be a substitute for human interaction or clinical treatment. While chatbots can offer valuable support and help people manage their symptoms, they are not a replacement for traditional clinical treatments such as medication or therapy.
- ▶ It is also important to note that chatbots may not be suitable for all individuals with depression, and some may require more intensive or personalized forms of treatment. It is crucial that individuals with depression consult with a mental health professional to determine the most appropriate course of treatment for their individual needs.

# Personal Thoughts/Reflections:

- ▶ In addition, while chatbots can offer a certain level of privacy and confidentiality, they are not completely secure, and their use should be supervised by mental health professionals to ensure that patients are receiving appropriate care and support. Mental health professionals can also help patients determine if chatbots are an appropriate form of treatment and can provide guidance on how to best integrate chatbots into a comprehensive treatment plan.

# Chatbot Disaster

The screenshot displays a news article on the Firstpost website. The browser's address bar shows the URL: `firstpost.com/world/belgian-man-dies-by-suicide-after-chatting-about-climate-change-wit...`. The article title is **Belgian man dies by suicide following long chats about climate change with AI bot**. The sub-headline reads: **A Belgian man became extremely depressed and died by suicide after he spent 6 weeks talking to an AI chatbot called ELIZA. The man was using the bot to chat about the environment and climate change, and how it was too late to do anything.** The author is Mehul Reuben Das, and the article was published on March 31, 2023, at 10:45:56 IST. The article features a video player for 'Firstpost Explainers' with a play button and a progress bar. Below the video player, there is a 'MOST READ' section with a top article titled 'US-South Korea drills push tension to 'brink of nuke war', says North Korea'. The Windows taskbar at the bottom shows the system tray with the date 4/5/2023 and time 11:36 PM, along with various application icons.

**THE KID IN BLUE WAS  
RAISED RIGHT**





Thank you