Evaluation of User Experience (UX) and Engagement in Chatbot-Based Symptom Checker (CSC) Applications

A Detailed Review

February 23, 2025

Contents

1 Introduction

Consumer Symptom Checker (CSC) apps are pivotal in modern digital healthcare, aiding users in symptom diagnosis, offering preliminary medical guidance, and directing users to healthcare professionals when necessary. However, user experience (UX) and engagement issues significantly impact their effectiveness. This study evaluates the UX and engagement of CSC apps, identifying key limitations and areas for improvement. By analyzing different aspects of UX and engagement, we aim to provide insights into how these applications can be optimized for better user satisfaction and trust.

2 User Experience (UX) Analysis

2.1 Ease of Use

Ease of use is fundamental to UX, as users expect seamless navigation when interacting with CSC apps. A well-designed user interface allows for efficient symptom input and reduces frustration. Some apps provide structured layouts that guide users through the process, but others require multiple clicks and complex steps, leading to a frustrating experience. Guided input forms enhance usability by simplifying symptom entry, but some apps struggle with handling complex symptom descriptions.

Table 1: Ease of Use Analysis

UX Factor	**Strengths**	**Weaknesses**
Navigation	Most CSC apps have structured layouts	Some require multiple clicks to reach results
Symptom Input	Provides guided input forms	Limited ability to handle complex descriptions

2.2 Comprehensibility

Comprehensibility is critical to ensuring that users can accurately describe their symptoms and understand the medical information provided. Many apps rely on medical jargon, which can be a significant barrier for non-expert users. While some apps simplify terminology and provide explanations for medical terms, others fail to offer sufficient context, leading to confusion and misinterpretation.

Table 2: Comprehensibility Analysis

UX Factor	**Strengths**	**Weaknesses**
Language	Some apps use simple terminology	Many use complex medical terms that confuse users
Explanations	Some apps provide descriptions of terms	Limited contextual explanations for medical terms

2.3 Input Flexibility

A major limitation in CSC apps is their inability to handle varied symptom descriptions. Many applications require users to select from predefined symptom lists, which can be restrictive. While AI-powered apps attempt to recognize synonyms and alternative descriptions, they often struggle with non-standard terms, slang, or complex descriptions, leading to user frustration.

Table 3: Input Flexibility Analysis

UX Factor	**Strengths**	**Weaknesses**
Symptom Input	Some apps allow free text input	Many apps require rigid, predefined terms
AI Recognition	AI-based apps attempt to match synonyms	Struggles with non-standard terms or slang

2.4 Conversational Design

Many CSC apps utilize chatbot interfaces to engage users and guide them through symptom assessments. While chatbots provide a structured way to collect user input, they often lack natural conversational flow and empathy. Users find interactions robotic, and the reasoning behind certain diagnostic questions is not always clear.

Table 4: Conversational Design Analysis

UX Factor	**Strengths**	**Weaknesses**
Chatbot Responsiveness	Some apps respond quickly	Many responses feel robotic and lack empathy
Flow of Questions	Structured conversation format	Poor explanation of why certain questions are asked

2.5 Inclusivity & Accessibility

Ensuring inclusivity is vital for reaching diverse demographics, yet many CSC apps lack multi-language support and accessibility features. Users who speak non-English languages or have disabilities often struggle with these apps. While some apps have basic accessibility features, such as text resizing or voice input, there is still significant room for improvement.

Table 5: Inclusivity & Accessibility Analysis

UX Factor	**Strengths**	**Weaknesses**
Language Support	Some apps offer multiple languages	Many lack support for non-English users
Accessibility	Basic accessibility options available	Limited features for visually impaired users

3 Engagement Analysis

3.1 User Retention & Interaction

User engagement plays a crucial role in retaining users. Features such as reminders, progress tracking, and personalized recommendations can significantly enhance user retention. While some apps implement these strategies effectively, others lack the necessary features to keep users engaged over time.

Table 6: User Retention & Interaction Analysis

Engagement Factor	**Strengths**	**Weaknesses**
Retention Features	Some apps use notifications and progress tracking	Many apps lack features to encourage continued use
User Interaction	Apps with chatbots create a conversational experience	Poor response time decreases engagement

3.2 Personalization

Personalization helps improve user experience by tailoring recommendations and tracking symptom history. Apps that allow users to store past interactions and analyze symptom trends offer better engagement. However, many CSC apps do not provide detailed customization or historical tracking, limiting their effectiveness.

3.3 Trust & Credibility

Trust is a crucial factor in user adoption of CSC apps. Many users hesitate to rely on these apps due to concerns about diagnostic accuracy and transparency. While some apps cite medical sources and provide disclaimers, many do not clearly explain how diagnoses are generated, reducing user confidence.

Table 7: Personalization Analysis

Engagement Factor	Strengths	Weaknesses
Health History Tracking	Some apps store past interactions	Many do not allow detailed customization
Symptom Tracking	A few apps provide historical analysis	Limited options for tracking improvement over time

Table 8: Trust & Credibility Analysis

Engagement Factor	Strengths	Weaknesses
Medical Credibility	Some apps cite medical sources	Many do not clearly explain diagnostic methods
Transparency	A few apps provide risk disclaimers	Users lack insight into how AI derives conclusions

4 Comparative Analysis of Existing CSC Apps

4.1 Feature Comparison Table

Table 9: Feature Comparison of CSC Apps

Feature	Ada	WebMD Symptom Checker	Buoy Health	Mediktor
Ease of Use	Intuitive UI	×Overloaded UI	Guided navigation	×Complex interface
Language Simplicity	Clear terms	×Uses medical jargon	Simple explanations	×Technical terms
Input Flexibility	×Rigid symptom lists	Allows some free text	AI-based recognition	×Predefined options only
Engagement	Chatbot-based	×No chatbot	Interactive UI	×Limited personalization
Trust & Credibility	Sources cited	Backed by WebMD	×Limited transparency	×Unknown methodology

5 Key Findings & Recommendations

5.1 Key Findings

- Users struggle with rigid symptom input, leading to frustration.
- Chatbots often lack human-like conversation quality.
- Limited inclusivity due to language barriers and accessibility shortcomings.
- Users express concerns about diagnostic transparency.

5.2 Recommendations

1. **Enhance Input Flexibility**: Implement approximate string matching to improve recognition of user input.
2. **Improve Conversational AI**: Utilize NLP advancements to create more natural chatbot interactions.
3. **Increase Transparency**: Explain the reasoning behind diagnostic questions and results.
4. **Personalized Symptom Tracking**: Allow users to log ongoing symptoms with trends and alerts.

5. **Expand Accessibility & Inclusivity**: Support more languages and ensure compliance with accessibility standards.

6 Evaluation of UX and Engagement in Healthcare Chatbots

6.1 Introduction

User Experience (UX) and Engagement are critical factors in determining the effectiveness of healthcare chatbots. A well-designed chatbot should offer an intuitive, accessible, and engaging experience while effectively assisting users in their medical needs.

This evaluation examines the **strengths, weaknesses, and engagement trends** of chatbots in healthcare based on existing applications.

6.2 Key UX & Engagement Factors in Healthcare Chatbots

To evaluate the UX and engagement of healthcare chatbots, we consider the following factors:

Table 10: Key UX & Engagement Factors

Factor	**Description**
Ease of Use	Intuitive interface and simple interaction.
Response Accuracy	Ability to provide relevant and correct medical advice.
Personalization	Tailoring responses based on user history and preferences.
Accessibility	Support for diverse users, including visually impaired or disabled people.
Engagement Methods	Features that keep users interacting, such as gamification or reminders.
Platform Availability	Whether the chatbot is web-based, app-based, or social media-integrated.
Speech & Multimodal Support	Ability to process voice input, text, and visual cues.

6.3 Comparative Analysis of Existing Chatbots

Based on the study, the following table compares healthcare chatbots in terms of UX and engagement.

6.3.1 Key Findings from the Table

- **Only 4 chatbots** support accessibility features.
- **Most chatbots lack personalization**, reducing engagement.
- **Limited speech input** is provided, affecting accessibility.
- **Engagement features are weak**, with only some offering reminders or gamification.

6.4 Diagrams & Trends in UX Evolution

6.4.1 Trend in Accessibility Features (2019–2023)

The accessibility of healthcare chatbots has remained low, with only a **minor increase** in UX considerations over the years.

6.4.2 Trend in Personalization & Engagement

While some progress has been made, personalization is still lacking in many chatbots.

Table 11: Comparison of Healthcare Chatbots

Chatbot	Purpose	Platform	Personalization	Accessibility	Speech Input	Engagement Features
[1]	Answer health-related questions & predict diseases	Web-based	No	No	No	Basic Q&A
[2]	Identifying stress relief	Heroku	No	No	No	Static responses
[3]	Patient monitoring	Telegram	No	No	No	Reminders
[4]	COVID-19 testing	AIML	No	No	No	Alert notifications
[5]	Symptom-based diagnosis	RASA, NLU	Basic	No	No	Interactive Q&A
[6]	Appointments & hospital information	NLP, gradient descent	Yes	Yes	No	Interactive interface
[7]	ADHD symptom support	Todaki	Yes	Yes	No	Gamification
[8]	Assisting deaf users	Algho platform	Yes	Yes	Yes	Sign language support
[9]	Chemotherapy symptom tracking	Facebook Messenger	Yes	No	No	Health reminders

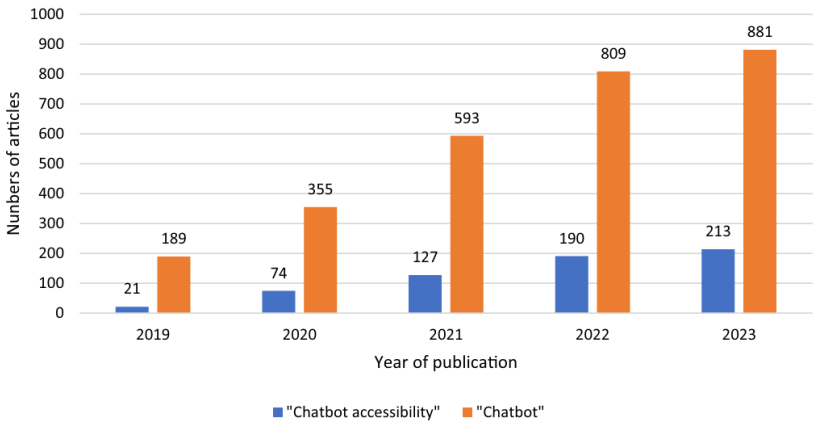

Figure 1: Accessibility Features in Healthcare Chatbots (2019-2023)

6.5 Challenges Identified

- **Lack of Personalization**: Most chatbots provide generic responses rather than adapting to user needs.
- **Limited Accessibility**: Few chatbots support multimodal interactions, speech input, or sign language.
- **Low Engagement Features**: Very few chatbots include gamification, habit tracking, or long-term

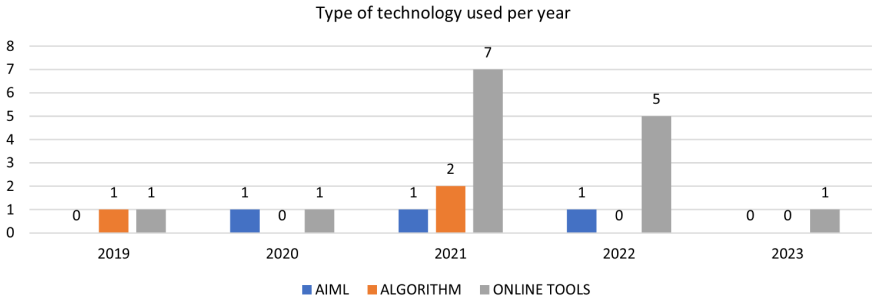

Figure 2: Chatbots Offering Personalized Responses

user retention methods.

- **Poor Handling of Natural Language Variations**: Many chatbots fail when users phrase questions differently from what was expected.

6.6 Recommendations for Improving UX & Engagement

Table 12: Recommendations for Improvement

Issue	**Recommendation**
Lack of personalization	Implement AI-driven adaptive responses based on user history.
Low accessibility	Introduce voice interaction and sign language features.
Poor engagement	Use gamification (rewards, progress tracking).
NLP limitations	Improve chatbot training with diverse datasets for better understanding.

6.7 Conclusion

While healthcare chatbots have improved over the years, their UX and engagement still need significant enhancement. Future developments should focus on **personalization, accessibility, and interactive engagement** to maximize their impact.

References

1. Allouch, M., Azaria, A., Azoulay, R.: Conversational agents: goals, technologies, vision and challenges. Sensors 21(24), 8448 (2021)

2. Xu, L., Sanders, L., Li, K., Chow, J.C.: Chatbot for health care and oncology applications using artificial intelligence and machine learning: systematic review. JMIR Cancer 7(4), e27850 (2021)

3. Abd-Alrazaq, A.A., Rababeh, A., Alajlani, M., Bewick, B.M., Househ, M.: Effectiveness and safety of using chatbots to improve mental health: systematic review and meta-analysis. J. Med. Internet Res. 22(7), e16021 (2020)

4. Chew, H.S.J., Achananuparp, P.: Perceptions and needs of artificial intelligence in health care to increase adoption: scoping review. J. Med. Internet Res. 24(1), e32939 (2022)

5. Restrepo EGY, Baldassarre M, Boticario JG: Accessibility, biases and ethics in chatbots and intelligent agents for education. In: EDULEARN19 Proceedings, pp. 8824–8833. IATED (2019)

6. Suhaili, S.M., Salim, N., Jambli, M.N.: Service chatbots: a systematic review. Expert Syst. Appl. 184, 115461 (2021)

7. Okonkwo, C.W., Ade-Ibijola, A.: Chatbots applications in education: A systematic review. Comput. Educ. Artific. Intell. 2, 100033 (2021)

8. Polignano, M., Narducci, F., Iovine, A., Musto, C., De Gemmis, M., Semeraro, G.: HealthAssistantBot: a personal health assistant for the Italian Language. IEEE Access 8, 107479–107497 (2020). https://doi.org/10.1109/ACCESS.2020.3000815

9. Gupta, J., Singh, V., Kumar, I.: Florence-a health care chatbot. In: 2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS), vol. 1, pp. 504–508. IEEE (2021)

10. Walss, M., Anzengruber, F., Arafa, A., Djamei, V., Navarini, A.A.: Implementing medical chatbots: an application on hidradenitis suppurativa. Dermatology 237(5), 712–718 (2021)

11. Chen, J.H., Agbodike, O., Kuo, W.L., Wang, L., Huang, C.H., Shen, Y.S., Chen, B.H.: Online textual symptomatic assessment chatbot based on QA weighted scoring for female breast cancer prescreening. Appl. Sci. 11(11), 5079 (2021)

12. Ireland, D., Bradford, D., Szepe, E., Lynch, E., Martyn, M., Hansen, D., Gaff, C.: Introducing Edna: a trainee chatbot designed to support communication about additional (secondary) genomic findings. Patient Educ. Couns. 104(4), 739–749 (2021)

13. Siglen, E., Vetti, H.H., Lunde, A.B.F., Hatlebrekke, T.A., Strømsvik, N., Hamang, A., et al.: Ask Rosa-the making of a digital genetic conversation tool, a chatbot, about hereditary breast and ovarian cancer. Patient Educ. Couns. 105(6), 1488–1494 (2022)

14. Ponmalar, A., Maansi, S., Mahalakshmi, S., Shalini, M., Madhavan, R.: Mobile application for hospital management system. In: 2021 5th International Conference on Intelligent Computing and Control Systems (ICICCS) (pp. 1434–1437). IEEE (2021).

15. Mittal, M., Battineni, G., Singh, D., Nagarwal, T., Yadav, P.: Web-based chatbot for frequently asked queries (FAQ) in hospitals. J. Taibah Univ. Med. Sci. 16(5), 740–746 (2021)

16. Dammavalam, S. R., Chandana, N., Rao, T. R., Lahari, A., Aparna, B.: AI based chatbot for hospital management system. In: 2022 3rd International Conference on Computing, Analytics and Networks (ICAN) (pp. 1–5). IEEE, (2022).

17. Apuzzo, C., Burresi, G.: Designing accessible chatbots for deaf people. In: 2022 11th Mediterranean Conference on Embedded Computing (MECO), pp. 1–4. IEEE (2022)

18. Kamita, T., Ito, T., Matsumoto, A., Munakata, T., Inoue, T.: A chatbot system for mental healthcare based on SAT counseling method. Mob. Inf. Syst. (2019). https://doi.org/10.1155/2019/9517321

19. Denecke, K., Vaaheesan, S., Arulnathan, A.: A mental health chatbot for regulating emotions (SERMO)-concept and usability test. IEEE Trans. Emerg. Top. Comput. 9(3), 1170–1182 (2020)

20. Jang, S., Kim, J.J., Kim, S.J., Hong, J., Kim, S., Kim, E.: Mobile app-based chatbot to deliver cognitive behavioral therapy and psychoeducation for adults with attention deficit: A development and feasibility/usability study. Int. J. Med. Informatics 150, 104440 (2021)

21. Lim, S.M., Shiau, C.W.C., Cheng, L.J., Lau, Y.: Chatbot-delivered psychotherapy for adults with depressive and anxiety symptoms: a systematic review and meta-regression. Behav. Ther. 53(2), 334–347 (2022)

22. Echeazarra, L., Pereira, J., Saracho, R.: TensioBot: a chatbot assistant for self-managed in-house blood pressure checking. J. Med. Syst. 45(4), 54 (2021)

23. Montenegro, J.L.Z., da Costa, C.A., Janssen, L.P.: Evaluating the use of chatbot during pregnancy: a usability study. Healthc. Anal. 2, 100072 (2022)

24. Dharwadkar, R., Deshpande, N.A.: A medical chatbot. Int. J. Comput. Trends Technol. 60(1), 41–45 (2018)

25. Barnett, A., Savic, M., Pienaar, K., Carter, A., Warren, N., Sandral, E., Lubman, D.I.: Enacting 'more-than-human' care: clients' and counsellors' views on the multiple affordances of chatbots in alcohol and other drug counselling. Int. J. Drug Policy 94, 102910 (2021)

26. Huang, M.Y., Weng, C.S., Kuo, H.L., Su, Y.C.: Using a chatbot to reduce emergency department visits and unscheduled hospitalizations among patients with gynecologic malignancies during chemotherapy: a retrospective cohort study. Heliyon 9(5), e15798 (2023)

27. Battineni, G., Chintalapudi, N., Amenta, F.: AI chatbot design during an epidemic like the novel coronavirus. Healthcare 8(2), 154 (2020)

28. White, B.K., Martin, A., White, J.A.: User Experience of COVID-19 chatbots: scoping review. J. Med. Internet Res. 24(12), e35903 (2022)

29. Chow, J.C., Sanders, L., Li, K.: Impact of ChatGPT on medical chatbots as a disruptive technology. Front. Artif. Intell. 6, 1166014 (2023)