

Applications of artificial intelligence in the mental healthcare
Field: smart chatbot as a model

Amr Hassan Fatouh
Lecture of Information Technology
In Department of Library and
Information, New Valley University
Marwa Hassan Fatouh
Delegated lecturer of Clinical Psychology
In Department of Psychology, New
Valley University

مستخلص:

تهدف هذه الورقة البحثية إلى التحقق من مدى إمكانية اعتماد روبوتات المحادثة المزودة بتقنيات الذكاء الاصطناعي في مجال الرعاية الصحية النفسية، وتحديدًا عندما يتم تقديمها من خلال تطبيقات الهواتف الذكية. حيث إن هناك روبوتات المحادثة الخاصة برعاية الصحة النفسية تمت برمجتها بتقنيات علاجية لمساعدة الأشخاص الذين يعانون من القلق والاكتئاب، وثبتت فاعليتها في تخفيف حدة هذه الأمراض، ولكن مازالت هناك مخاوف من استخدامها وفي مقدمتها الخصوصية وسرية المعلومات الخاصة بالمرضى. تقدم الدراسة مراجعة علمية للأدبيات العلمية المنشورة حول تطبيقات رعاية الصحة النفسية، مع التركيز على روبوتات المحادثة المزودة بتقنيات الذكاء الاصطناعي. أجريت في الفترة من يوليو ٢٠٢١ إلى يناير ٢٠٢٢. اعتمدت الدراسة استبيانيًا إلكترونيًا من Google Drive لاستطلاع آراء الخبراء والمتخصصين في مجال الرعاية الصحية النفسية. تم توزيع الاستبيان من خلال مجموعة خبراء الرعاية الصحية النفسية عبر شبكة التواصل الاجتماعي فيسبوك





التي تضم أكثر من ٢٢ ألف خبير ومتخصص في المجال. تمت الإجابة على الاستبيان من قبل ٣٢٥ خبيراً ومتخصصاً.

كشفت نتائج الدراسة عن الحاجة المتزايدة إلى روبوتات المحادثة الخاصة بالرعاية الصحية النفسية، وأن هذه الروبوتات من الصعب الاعتماد عليها كلياً في المعالجة فهي ليست بديلاً عن المعالج النفسي، ولكن من المتوقع في المستقبل القريب أن يعتمد عليها بشكل كبير، حيث إن هناك عديد من البحوث والدراسات تعمل على تطوير هذه الروبوتات لفهم لغة الإنسان وتعبيراته، ومن ثم التعامل معه وبدقة عالية.

Abstract:

Purpose - The field of mental health care has been using artificial intelligence (AI) for decades. This study intends to investigate chatbots for artificial intelligence, particularly as they are provided through mobile applications for mental health treatment while paying attention to the social ramifications of these technologies. For instance, chatbots for mental health services It has therapeutic technologies pre-programmed to assist those suffering from anxiety and despair, but it's still Unstable. This technology allays worries about the utility, confidentiality, safety, and security of applications.

Design/methodology/approach - The study was Carried out from July 2020 to January 2022 and adopted the survey method to collect data by using an electronic questionnaire from Google Drive to survey the opinions of experts and professionals in the field of mental health care. The questionnaire was distributed by a group of mental health care experts through the social network Facebook, which includes more than 22,000 experts and specialists in the field. 325 experts and specialists answered the questionnaire.

Outcomes - As technology progresses and the demand for mental health care chatbots rises, an AI chatbot might offer a space for someone. AI is not a substitute for a therapist or other mental health professionals; it provides access to tools and a discussion platform, as well as a mechanism to monitor moods and improve mental health literacy.

In the end, mental health care chatbots must be regulated, and society must avoid technical fundamentalism regarding artificial intelligence for mental health.



Value - This paper adds to the scarce but expanding body of information science research on the use of AI to promote mental health care.

الكلمات المفتاحية:

رعاية الصحة النفسية (MHC) ، الذكاء الاصطناعي (AI) . روبوت المحادثة، علم المعلومات.

Keywords:

Mental Health Care (MHC), Artificial Intelligence (AI), Chatbot, Information Science, Facebook, Mental health care experts.

1- Introduction:

This study aims to demonstrate how artificial intelligence (AI) in mobile applications for mental health care affects society. Although there isn't a consensus definition of artificial intelligence at this time in research, the general concept is "technology designed to do activities that typically require human intelligence." (Hamet & Tremblay, 2017) Artificial intelligence is used in this definition to mean "a technology designed to accomplish things that typically require human intelligence.(Luxton, 2014) " Artificial intelligence has been applied to the treatment of mental illness for many years. However, there are many problems with its current applications, including efficacy, privacy, understanding things in a way that simulates the human mind, and security, as it is used in both mental health apps marketed by clinicians and clients AI must be able to decide on moral principles, but it is affected by algorithmic bias. (Hu, Lu, Pan, Gong, & Yang, 2021).

AI must be evaluated through a socially conscious lens at every level of its development, from concept and design to distribution and regulation, in order to be used efficiently and ethically in mental health care (Damij & Bhattacharya, 2022). Sometimes used in mental health care, chatbots are artificial intelligence applications. Frequently referred to as "completely automated chat agents,"(Jenneboer, Herrando, & Constantinides, 2022), Chatbot MHC has voice or text communication interfaces that resemble human speech. The purpose of chatbots is to use therapeutic technologies to assist those with mental health difficulties (Hamet & Tremblay, 2017). Chatbots for mental health care is a component of a larger socio-technical system, which describes how society and technology interact. Technology is fueled by social processes, and





use is influenced by social context. Societies should ideally direct technological change (Eisenberg, Downs, Golberstein, & Zivin, 2009). The development of chatbots for mental health is covered in this paper, along with a review of their present applications and an examination of the issues they raise and their potential in the future from the perspective of social informatics.

2- Mobile applications for mental health care:

The concept of using the Internet to support mental health is not new. Internet-based mental health care interventions, such as electronic therapy, as well as online interventions, such as websites dedicated to psychoeducation, have been used for many years (Gnan et al., 2019). Artificial intelligence in mental health is also not a recent development; Virtual humans have been used since 1973 to help while mitigating the risk of suicide (Lucas, Gratch, King, & Morency, 2014).

3- Examples of Mental Health Chatbots Apps:

3-1 Woebot ⁱ: was developed in 2017 to assist patients and doctors in keeping track of their patients' moods. Patients can communicate their ideas while having therapeutic chats with the robot. Woebot employs cognitive behavioral therapy CBT was initially created for young adults and graduate students.

3-2 Moodkits ⁱⁱ: One of the top apps for treating depression. With a variety of activity tools that recommend appropriate activities users can take to improve their mental health, this chatbot also draws inspiration from CBT. The bot was built by the mobile development company Thriveport, which committed to do so in 2010.

3-3 Wysa ⁱⁱⁱ: Using a variety of tools and approaches, such as dialectical behavior therapy (DBT), evidence-based cognitive-behavioral therapy, and guided meditation, an intelligent AI-based conversational bot assists in managing thoughts and emotions.

3-4 Youper ^{iv}: The chatbot use mindfulness methods that use a brief, individualized dialogue to assess and improve emotional wellness. The software guides how to meditate in addition to mood tracking. It adjusts the experience to better meet needs as it gains more user-specific knowledge.

4- Methodology:

The study adopted a mixed methods approach as follows:



A literature review on AI applications for mental health support, with a focus on mental health chatbots, was conducted from July 2020 to Jan 2022. Articles were obtained from the scientific databases available through the Egyptian Knowledge Bank (EKB) portal. The researcher also used the Apple App Store, which is used on iOS devices, and Google Play Store, which is used on Android mobile devices, to find and access Mental health care apps. In general, sources were included in the literature review if they referred to: artificial intelligence in mental health care and chatbots. To analyze the issue of artificial intelligence in mental health care, the researcher used a theoretical approach that combines information science and psychology.

The authors monitored nearly forty interdisciplinary studies linking information science with psychology, while the studies that employed information science in the field of mental health care were few, only six studies - all of which focused on employing artificial intelligence in this field, while the current study tried to find out the opinions of health care experts in MHC applications as one of the modern methods of mental treatment.

The study used the quantitative method to collect data. To survey the opinions of experts in the field of mental health care about using Chatbot applications equipped with artificial intelligence techniques in the field of health care, the study adopted an electronic questionnaire from Google Drive to survey the opinions of experts. The questionnaire was distributed through the group of mental health care experts via the social network Facebook, which includes more than 22,000 experts and specialists in the field. The questionnaire was answered by 325 experts.

5- Discussion Results:

5-1 Use of Chatbots in MHC Field

Mental health experts believed chatbots to be extremely essential (66 %) or fairly (11 %) when asked about the perceived value of chatbots (Figure 1). In comparison, 20% thought MHC chatbots were not important at all.

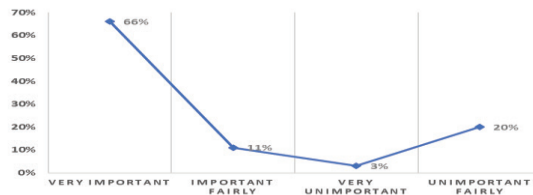


Fig. 1. Chatbots' importance in mental health care.





Additionally, a list of some of the chatbots now accessible for use in mental health was given to the professionals and experts polled, and they were asked how familiar they were with these chatbots. Most respondents have not utilized any of these programs, which stands out in their comments. The majority (39 %) of respondents were unsure or uninformed of whether their clients used mental health chatbots, while (25 % of respondents) felt their clients do (with 36 % not utilizing them).

5-2 Benefits of Using Chatbots in MHC

In (Figure. 2) MHC chatbots could aid their clients in better managing their own health, according to respondents (79%). Additionally, access and timeliness of care were thought to be improved (75%), as well as the reduction of travel time to MHC providers (81%). Most respondents (60%) thought MHC chatbots might reduce the need for unneeded trips to MHC clients, and that chatbots may receive more information from clients than mental healthcare professionals (48%).

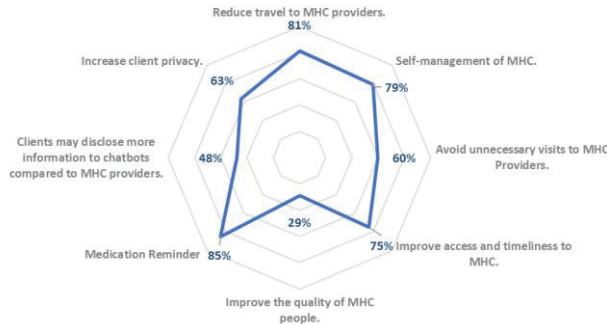


Fig. 2. Benefits of MHC chatbots for clients.

Another benefit is the improvement in reminding the patient of regular medication appointments (85%). Finally, the privacy of information is one of the most prominent benefits of using a chatbot in the field of MHC (63%), it is possible for the patient to disclose information to the application that he may find embarrassing to present to the therapist, and on the other hand, privacy is a major challenge that may prevent some patients from using it for fear of the confidentiality of their data.

On a scale from 0 to 5 (obstruct my work), respondents were asked how much they thought MHC chatbots would help or hinder their ability to perform their job-related duties. The replies had a mean of 2.87 and a standard deviation of 1.11, with an observed range of 0 to 5. MH professionals were also asked how likely it would be for MHC chatbots to play a significant role in their patient's health in



the future rather than their healthcare provider, and more than half of those surveyed (52%) believed it would most likely occur, with (25%) believing it would be very likely.

5-3 Importance of chatbots in MHC

Additionally, respondents were asked if they would recommend mental health chatbots to their patients. The participants answered that they are very likely (21%) or moderately likely (33%) to recommend these apps to their clients, whereas just 17% and 29% of the participants said they are very unlikely and unlikely, respectively, to do. In Figure 3. Although respondents were more likely to be male than female, there was no statistically significant difference in the proportion of men and women who would recommend using mental health care chatbots for their clients.

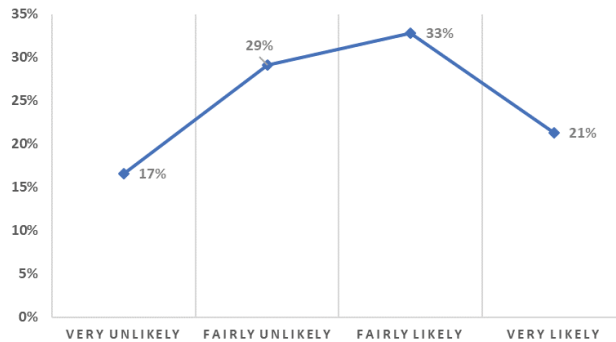


Fig. 3. Propensity to advise clients to use chatbots for mental healthcare.

6- Challenges and Risks to use MHC Chatbots:

Despite the benefits of using chatbots in MHC, there are also many challenges (Figure 4). The biggest challenge identified when using chatbots for mental health was that chatbots cannot adequately understand or represent human emotions (91%), It also lacks intelligence in accurately diagnosing the condition of patients (65%), Where patients may not be able to express their health status in a clear way that chatbot can understand. Other challenges highlighted are that chatbots cannot effectively care to the full extent of the client's needs (70%). Also The data privacy of patients is a major challenge in using these applications (85%), that may be misused in the future. While some patients may not feel satisfied enough while using these applications (81%) compared to MHC providers. patients may not clearly understand the diagnostic result generated by these applications, which may indirectly cause physical or psychological





harm (75%). Also The cost can also be a challenge as most of these apps are paid and not free (88%). Finally, some may find it difficult to use these applications for self-diagnosis at times (61%).

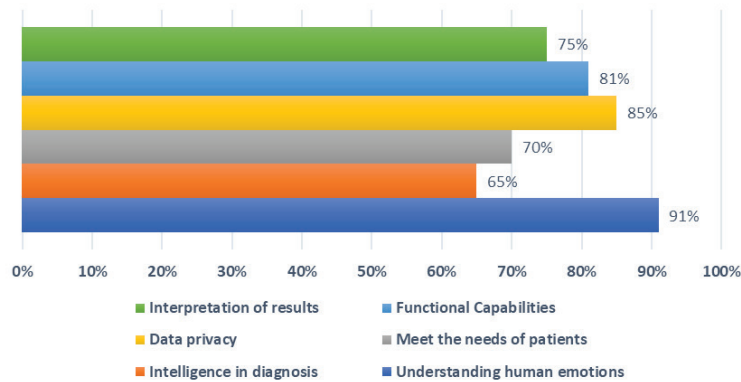


Fig. 4. Challenges and Risks to use MHC Chatbots

According to study respondents, healthcare chatbots will probably influence client's health more in the future than healthcare providers. According to the poll results, the majority of participants believe that chatbots have advantages for mental health, and they also believe that chatbots are of relatively high importance. The years of experience that respondents had as mental health professionals were compared to various judgments that they might have concerning chatbot use using Spearman's rank correlation coefficient. With more practice, there was a growing consensus that MHC chatbots might assist people in particular mental health management areas and aid patients in improving their own mental health management. $r = 0.543$, $p = 0.01$, and raise the standard of mental health care provided to individuals ($r = 0.521$). Additionally, there were statistically significant correlations between more experience and the likelihood of advising medical professionals to prescribe mental health chatbots ($r = 0.219$, $p = 0.03$), as well as the likelihood of advising patients to use chatbots for mental health at 6 years ($r = 0.213$, $p = 0.03$). The findings demonstrate that as people gain experience, so does their belief that the use of chatbots improves the quality of care, patient self-management, access to care, and support can improve mental health workers in their roles. All of these correlations are statistically significant ($p = 0.04$). Similar to this, as mental health practitioners acquire experience, the likelihood of both suggesting and enforcing the usage of chatbots rises.

7- Conclusion:





Studies show that there is a direct relationship between low family income and mental health problems, which means that people who need psychological treatment are often unable to afford it. In addition, there are concerns about modern life, sometimes even those who can afford it feel that they do not have time to go to see a therapist. It's also interesting that research has shown that people are more willing to open up about a bot compared to a real human, perhaps because they aren't worried about being judged. But assigning a chatbot to take care of someone at risk would be irresponsible, as it is dangerous for an AI-managed bot to provide inappropriate information that could end up giving bad advice to people in a dangerous state of mind.

There are also privacy concerns. Research has shown that some smartphone apps used to treat depression and stop smoking have shared data with commercial third parties without disclosing it accurately beforehand. This presents a major danger to the whole notion of health services applications, according to John Toros, director of the division of digital psychiatry at Beth Deaconess Medical Center in the US. Although most countries have established strong laws protecting patient confidentiality in a traditional therapeutic setting, it has not yet been determined How to extend this to applications and websites (Luxton, 2014).

References:

- Cameron, G., Cameron, D., Megaw, G., Bond, R., Mulvenna, M., O'Neill, S., . . . McTear, M. (2018). Assessing the usability of a chatbot for mental health care. Paper presented at the International Conference on Internet Science.
- Damij, N., & Bhattacharya, S. (2022). The Role of AI Chatbots in Mental Health Related Public Services in a (Post) Pandemic World: A Review and Future Research Agenda. Paper presented at the 2022 IEEE Technology and Engineering Management Conference (TEMSCON EUROPE).
- Eisenberg, D., Downs, M. F., Golberstein, E., & Zivin, K. (2009). Stigma and help seeking for mental health among college students. *Medical Care Research and Review*, 66(5), 522-541.
- Gnan, G. H., Rahman, Q., Ussher, G., Baker, D., West, E., & Rimes, K. A. (2019). General and LGBTQ-specific factors associated with mental health and suicide risk among LGBTQ students. *Journal of Youth Studies*, 22(10), 1393-1408.
- Hamet, P., & Tremblay, J. (2017). Artificial intelligence in medicine. *Metabolism*, 69, S36-S40.





- Hu, Q., Lu, Y., Pan, Z., Gong, Y., & Yang, Z. (2021). Can AI artifacts influence human cognition? The effects of artificial autonomy in intelligent personal assistants. *International Journal of Information Management*, 56, 102250.
- Jenneboer, L., Herrando, C., & Constantinides, E. (2022). The Impact of Chatbots on Customer Loyalty: A Systematic Literature Review. *Journal of theoretical and applied electronic commerce research*, 17(1), 212-229.
- Lucas, G. M., Gratch, J., King, A., & Morency, L.-P. (2014). It's only a computer: Virtual humans increase willingness to disclose. *Computers in Human Behavior*, 37, 94-100.
- Luxton, D. D. (2014). Artificial intelligence in psychological practice: Current and future applications and implications. *Professional Psychology: Research and Practice*, 45(5), 332.

i <https://woebothealth.com/>

ii <https://www.thriveport.com/products/moodnotes/>

iii <https://www.wysa.io/>

iv <https://www.youper.ai/>

