Master of Two Worlds: Narrative Intelligence as the Next Step for Mental Health Chatbots

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ABSTRACT

AI-powered chatbots hold unique promise for mental health support in that they can be easily accessible and seen as non-judgmental allies. However, prior research has identified problems with current mental health chatbots that nearly outweigh the potential benefits: they are addictive, do not provide sufficient emotional support, and even keep users from facing their problems in reality. This paper presents the hypothesis that *narrative intelligence* is an essential component for a future AI chatbot for mental health. A prototype was built to help explore this possibility that allows users to converse with a chatbot storyteller and receive support in the context of a separate "narrative world". We consider preliminary feedback from users about engaging with the prototype and describe lessons learned for future work.

CCS CONCEPTS

• **Human-centered computing → Natural language interfaces**.

KEYWORDS

narrative intelligence, mental health, chatbots

1 INTRODUCTION

While extensive research has yet to be conducted in the area of chatbots for mental health, prior work has discussed their potential for providing inexpensive and accessible support [11, 16]. Recent work has called for chatbots in mental health to have "memories" of their conversations, thus enhancing the storytelling power of the chatbot in supporting mental health even without complex AI [13]. Adding further storytelling capabilities to an AI-powered chatbot for mental health has not been adequately explored. While some chatbots have been designed with the idea of presenting stories in mind, they have ultimately shown to have been lacking in narrative intelligence, leading to confused and irritated users as a result [3, 9].

In this paper, we will explore the limitations of existing chatbots and tools for mental health. Design details of a prototype for a mental health chatbot in the context of a narrative experience will be presented as inspired by the gaps in current work. We posit that future chatbots could rely on narrative intelligence techniques to help engage users just enough while overcoming existing barriers such as limited emotional support and chatbot addiction. In order to gather insights for future work in this area, a pilot study was conducted in which users provided feedback through interacting with the prototype. These preliminary results are limited in that participants were members of the general population as recruited by convenience sample and not necessarily in need of mental health support. Nonetheless, the results appear to reveal key lessons in designing chatbots with narrative intelligence for mental health.

2 CHATBOTS IN MENTAL HEALTH SUPPORT

Various existing chatbots for mental health have generally proven to be highly engaging for users and able to dispense helpful information. However, they have been found to be limited because they lack variability in their responses, are unable to comprehend user responses in some cases, and do not display intelligence overall [4, 10, 13].

Future chatbots must be designed with more robust and sophisticated AI components, but there are additional troubling aspects that must be addressed. Broadly, current applications for mental health do not necessarily align with user expectations and needs, even if they are engaging or addictive. Prior work has indicated that such apps may not emotionally support users when they need comfort to reduce symptoms of a mental health disorder. Additionally, past research has also indicated that digital interventions for mental health may discourage face-to-face interactions as well as distract users from real-life problems [8].

Although it is beneficial to provide easy access to support when users are in need, some researchers have expressed concern about users becoming over-reliant on constant support from a chatbot specifically [12]. The fear is that the constant presence of a chatbot (or similar system) without some kind of limit - or at least encouragement to help users recognize when to stop - could worsen addictive behaviors. This was echoed by users when speaking generally of mental health apps; they found themselves addicted to using such apps despite the fact that they didn't feel better as a result, and also despite the fact that as a consequence their social life in reality suffered [8].

Individuals requiring mental health support often are reluctant to provide honest information as it relates to their care. However, they are generally more inclined to disclose truthful information with a chatbot when they believe it is not operated by a human [15].

This potentially suggests that a chatbot could serve as a low-cost, intermediate step in mental health care [14]. At the same time, the fact that a user would essentially extend more trust to a chatbot than a human in some cases presents privacy, safety, and ethical concerns [21]. While we will discuss some of our design decisions with these aspects in mind, we will not focus the thesis of this paper on these concerns as they deserve full papers in their own right. Instead, we direct designers to engage with discussions in related fields (e.g., [7]).

In this work, we will focus on the question of whether implementing elements of narrative intelligence in a future mental health chatbot might feasibly foster engagement while providing adequate emotional support, preventing addiction, and reducing isolation. To gather insights about how users would react to a chatbot within a narrative context, a prototype of an online interactive narrative experience (*Betwixt*) was developed using the Ink narrative scripting language. The following sections will discuss the design decisions for this system as they relate to prior work.

3 MODELING A CHATBOT STORYTELLER FOR MENTAL HEALTH SUPPORT

3.1 Providing Emotional Support

When interacting with the prototype, the user is made aware that they will be interacting with a chatbot from the beginning to align with safety recommendations [12]. The chatbot is presented to the user in an abstract way - simply a voice that listens - and the user is able to define who it is for themselves. It is explained to the user that anything they type, as well as the choices they select, are only stored locally for the purposes of the narrative experience and not viewed or retained by the developers in any way. These design choices were meant to help provide the user with a transparent and trustworthy virtual ally that can provide intermediate, non-judgemental support.

During the experience, the user is able to hear sounds related to the narrative. These sounds are meant to connect the user with the story, as well as provide emotional regulation and support [20]. In a future iteration, these sounds are expected to be generated and controlled by the AI storyteller. However, for the purposes of this initial study, the sounds were manually embedded.

Similarly, a chatbot with a fully-developed ability to independently understand and generate narrative structures is expected to have a greater capacity to provide emotional support to users than existing chatbots. A true mastery of narrative understanding is the aim for future work, but is only approximated in this prototype for the purposes of this initial study.

3.2 Fostering Sufficient Engagement

Each conversation with the user is carefully paced, and the chatbot does not reveal everything about itself or the story to the user immediately. In so doing, the chatbot can foster engagement by way of mystery and suspense. This minimum level of engagement was deemed necessary to keep the user focused on trying new strategies and focused on receiving support, as opposed to being sidetracked by busy thoughts, worries, or other distractions that would lead to poor health outcomes.

3.3 Preventing Addiction and Reducing Isolation

The chatbot's conversation is expressed within the context of a narrative dream, similar to a book chapter, with a clear beginning and resolution. A natural stopping place for the user occurs when a dream reaches a satisfying ending state. These smaller bites of story rather than constant conversation are meant to encourage self-resilience and help users discern when they should take a break. Further, it is hypothesized that these narrative bites will encourage users to engage with the real world again once they have conversed with the AI, and identified or practiced strategies they can use in the real world. For the purposes of assessing this initial idea, narrative transitions are encoded manually. However, future AI systems are expected to be able to establish this pacing and storypoint generation based on the current state-of-the-art in interactive storytelling [17].

3.4 Helping the User Master Two Worlds

The story arc of the narrative dream also serves a second purpose: transitioning the user into a separate, in-between mental space. Text describes the transition in and out of the space and is presented at a deliberately slow pace in line with hypnotherapy techniques [1]. These design decisions are meant to not only provide additional emotional support to the user and reduce stress in the moment, but to help the user more easily differentiate between the narrative world with the chatbot and the real world. It is hypothesized that by making these two "worlds" more distinct in the users' mind, it will be easier for users to recall strategies within the chatbot experience and apply them in real life contexts. Using storytelling for learning transfer has been demonstrated before in educational contexts (e.g. [19]), but not yet effectively via chatbots for mental health [9].

4 METHOD

To gain preliminary feedback on the narrative chatbot, 300 individuals were recruited via convenience sampling through a call to action on an online discussion board to participate in the study. Participants were asked to navigate through four narrative "dreams", with prompts to provide feedback after Dream 2, as well as after Dream 4.

4.1 Feedback Questions

After Dream 2, participants were asked:

(1) How engaging are you finding [the experience] so far? (Very engaging, Engaging, So-so, Not engaging)
(2) What were your favourite parts so far, and why?
(3) What would improve your experience of [the interactive narrative]?

After Dream 4, participants were asked the following:

(1) How would you sum up your overall experience of [the interactive narrative]?
(2) We're interested in how [this experience] helps different people. If you feel you've benefited from the game, what would you say it has taught you, helped you with or enabled you to do better?

(3) On a scale of 0-10, how likely are you to recommend [the interactive narrative] to relevant friends?

5 PRELIMINARY RESULTS

Of the 300 participants, 85 participants opted to provide feedback. 46 provided feedback only after Dream 2, 35 provided feedback after Dream 2 and Dream 4, and 4 only provided feedback after Dream 4 (but not after Dream 2).

5.1 Engagement Ratings

81 participants provided engagement ratings after Dream 2. Of the 46 who only provided Dream 2 feedback, 7 selected "So-so", 12 selected "Engaging", and 26 selected "Very Engaging". Of the 35 participants who continued on to Dream 4, 1 indicated their response was "Engaging/So-so", 15 chose "Engaging", and 19 chose "Very Engaging". Overall, 72 out of 85 participants (84.7%) rated the experience as either "Engaging" or "Very Engaging".

5.2 Quantitative Net Promoter Score

The net promoter score (NPS) was obtained based on the answer to the third prompt in the post-Dream 4 question set. Of the 35 participants who completed the Dream 4 feedback questions, 2 declined to answer, 3 were classified as *detractors* (score from 0-6), 10 as *passives* (score from 7-8), and 20 as *promoters* (score from 9-10). The NPS was calculated as 48.57% by subtracting the percentage of detractors (8.57%) from the percentage of promoters (57.14%).

5.3 Open-ended Feedback

An inductive coding process was followed when analyzing the responses for Prompt 1 of the Dream 4 question set. The following major codes were used to characterize responses: *enjoyment* (found the experience pleasurable), *engagement* (found the experience intriguing and wanted to continue), *beneficial change* (found the experience to be helpful in finding insight and promoting a change in self), and *separate world/state* (noting that the dream experience felt separate from reality in some way). The most common theme was *enjoyment* (19/35), followed by *engagement* (9/35), *beneficial change* (8/35), and *separate world* (3/35). Only 2/35 comments of negative sentiment were identified: one classifying the experience as "good but short", and another that noted it was enjoyable but somewhat predictable. Participants also noted in their response that the experience could be beneficial for users requiring general mental health (9/35, not including the following categories), anxiety (3/35), and attention deficit disorder (2/35) support.

6 LESSONS LEARNED TOWARD AI-POWERED CHATBOT STORYTELLERS FOR MENTAL HEALTH

Based on the results of the initial study, the following lessons were identified to direct future work in this area:

(1) **The importance of two worlds, and the space between:** Users appeared to appreciate a transition (via music and slow, timed pacing) into a separate, "in-between" mental space. Many also noted that they did not complete the experience in one sitting, and felt encouraged by the interface to come back

to the experience after some time. One user remarked that the experience felt like a intermediate step for those with social anxiety. They described the conversation as helpful due to speaking with a "non-judgemental" narrator that would not be "burdened", and stated that the experience overall was a step toward opening up and speaking more with real people. Broadly, participants indicated that using the app could help patients with a variety of mental health conditions make progress. An AI chatbot that is capable of providing a story contextualized within a separate mental space and bearing a clear resolution may encourage users not to engage with a mental health chatbot for hours on end. Instead, results suggest that such an experience may encourage users to speak with the chatbot for only a short period of time, and then - by way of the story's ending - implicitly encourage users to return to the "real world" to connect with others, apply newly-learned strategies during difficult situations, and build self-resilience. A well-designed AI chatbot of the future should be able to help provide users with skills and confidence to strengthen this return.

(2) **Pacing and interactive prompt attributes may be tied to effectiveness**: Participants praised the fact that the experience was designed to help users "stop, think and feel" as they spoke with the chatbot. While more research is needed to determine what elicited these descriptions, it is possible that the gentle pace of the story combined with the interactive prompts tied to narrative descriptions of the space helped the experience feel immersive and grounding. Future work should thoroughly examine and compare how AI-powered chatbots can develop these kinds of narrative descriptions and interactions smoothly.

(3) **Mystery keeps users focused on the support experience "just enough":** Open-ended feedback suggested that the mystery of the presented narrative and waiting for what the chatbot would say next appeared to engage users, keeping them in suspense and focused on the presented strategies. While the elements of mystery were manually encoded for the purposes of the pilot study, future work should seek to incorporate and assess AI-generated suspense and mystery elements within the context of a mental health chatbot narrative experience. This is believed to be feasible due to an already blossoming field of computational models for narrative and suspense [5, 6, 18].

(4) **Surprising continual story generation as a next step**: Users pointed to predictability and a short length of the overall experience (4 dreams) as negative factors. These results suggest that a future AI with even more sophisticated narrative intelligence, including the capability of building its own surprising stories with less of a need for manual authoring, would improve this type of experience. Future work should explore how models of narrative generation and surprise (e.g. [2]) might be applied or transformed within the context of mental health support. An HCI, field-focused approach will be important to gain further insights from users specifically relevant to in-the-wild challenges.

It is expected that the design implications from this pilot study will be used to expand on the prototype presented here in future work. Overall, results suggest that research integrating narrative intelligence with a mental health chatbot interface holds promise for training and emotionally supporting users while helping them stay connected with real life.

ACKNOWLEDGMENTS

REFERENCES

[1] Alizamar Alizamar, Ifdil Ifdil, Rima P Fadli, Lira Erwinda, Nilma Zola, Elfi Churnia, Khairul Bariyyah, Refnadi Refnadi, and Itsar B Rangka. 2018. The effectiveness of hypnotherapy in reducing stress levels. *Addictive Disorders & Their Treatment* 17, 4 (2018), 191–195.

[2] Byung-Chull Bae and R Michael Young. 2013. A computational model of narrative generation for surprise arousal. *IEEE Transactions on Computational Intelligence and AI in Games* 6, 2 (2013), 131–143.

[3] Samuel Bell, Clara Wood, and Advait Sarkar. 2019. Perceptions of chatbots in therapy. In *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems*. 1–6.

[4] Gillian Cameron, David Cameron, Gavin Megaw, Raymond Bond, Maurice Mulvenna, Siobhan O'Neill, Cherie Armour, and Michael McTear. 2018. Assessing the usability of a chatbot for mental health care. In *International Conference on Internet Science*. Springer, 121–132.

[5] Yun-Gyung Cheong and R Michael Young. 2006. A Computational Model of Narrative Generation for Suspense.. In *AAAI*. 1906–1907.

[6] Yun-Gyung Cheong and R Michael Young. 2014. Suspenser: A story generation system for suspense. *IEEE Transactions on Computational Intelligence and AI in Games* 7, 1 (2014), 39–52.

[7] Roddy Cowie. 2015. Ethical issues in affective computing. In *The Oxford handbook of affective computing*. Oxford University Press, 334–348.

[8] Fernando Estrada Martinez de Alva, Greg Wadley, and Reeva Lederman. 2015. It feels different from real life: users' opinions of mobile applications for mental health. In *Proceedings of the Annual Meeting of the Australian Special Interest Group for Computer Human Interaction*. 598–602.

[9] Johan Oswin De Nieva, Jose Andres Joaquin, Chaste Bernard Tan, Ruzel Khyvin Marc Te, and Ethel Ong. 2020. Investigating Students' Use of a Mental Health Chatbot to Alleviate Academic Stress. In *6th International ACM In-Cooperation HCI and UX Conference*. 1–10.

[10] Kathleen Kara Fitzpatrick, Alison Darcy, and Molly Vierhile. 2017. Delivering cognitive behavior therapy to young adults with symptoms of depression and anxiety using a fully automated conversational agent (Woebot): a randomized controlled trial. *JMIR mental health* 4, 2 (2017), e19.

[11] Asbjørn Følstad, Petter Bae Brandtzæg, Tom Feltwell, Effie LC Law, Manfred Tscheligi, and Ewa A Luger. 2018. SIG: chatbots for social good. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems*. 1–4.

[12] Kira Kretzschmar, Holly Tyroll, Gabriela Pavarini, Arianna Manzini, Ilina Singh, and NeurOx Young People's Advisory Group. 2019. Can your phone be your therapist? Young people's ethical perspectives on the use of fully automated conversational agents (chatbots) in mental health support. *Biomedical informatics insights* 11 (2019), 1178222619829083.

[13] Minha Lee, Sander Ackermans, Nena van As, Hanwen Chang, Enzo Lucas, and Wijnand IJsselsteijn. 2019. Caring for Vincent: a chatbot for self-compassion. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. 1–13.

[14] Yi-Chieh Lee, Naomi Yamashita, Yun Huang, and Wai Fu. 2020. " I Hear You, I Feel You": Encouraging Deep Self-disclosure through a Chatbot. In *Proceedings of the 2020 CHI conference on human factors in computing systems*. 1–12.

[15] Gale M Lucas, Jonathan Gratch, Aisha King, and Louis-Philippe Morency. 2014. It's only a computer: Virtual humans increase willingness to disclose. *Computers in Human Behavior* 37 (2014), 94–100.

[16] Adam Miner, Amanda Chow, Sarah Adler, Ilia Zaitsev, Paul Tero, Alison Darcy, and Andreas Paepcke. 2016. Conversational agents and mental health: Theory-informed assessment of language and affect. In *Proceedings of the fourth international conference on human agent interaction*. 123–130.

[17] Jonathan D Moallem and William L Raffe. 2020. A Review of Agency Architectures in Interactive Drama Systems. In *2020 IEEE Conference on Games (CoG)*. IEEE, 305–311.

[18] Brian O'Neill and Mark Riedl. 2014. Dramatis: A computational model of suspense. In *Proceedings of the AAAI Conference on Artificial Intelligence*, Vol. 28.

[19] Jon-Marc G Rodriguez and Marcy H Towns. 2019. Catalyzing student learning: using analogies to teach enzyme kinetics. *Journal of Chemical Education* 96, 7 (2019), 1401–1406.

[20] Daniel C Semenza. 2018. Feeling the beat and feeling better: musical experience, emotional reflection, and music as a technology of mental health. *Sociological Inquiry* 88, 2 (2018), 322–343.

[21] Marita Skjuve and Petter Bae Brandtzæg. 2018. Chatbots as a new user interface for providing health information to young people. *Youth and news in a digital media environment–Nordic-Baltic perspectives* (2018).