

College Tales: Pilot Study on Large Language Models Generated Narratives for Mental Health Literacy

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ABSTRACT

Mental health, while a crucial component of health, has often been neglected and stigmatised. University students, considering their unique situations and stressors, are more vulnerable to experiencing mental health challenges and being affected by stigma. The use of Large Language Models (LLMs) creates an opportunity to impart knowledge through digital interventions to address stigma, misinformation, and increase Mental Health Literacy in university students. Using a LLM generated prompt game, we conducted a pilot study with 5 mental health professionals. Through semi-structured interviews about the prototype and the narrative, we identified several narrative problems, such as missing information or overly simplified concepts. While the prototype has limitations, the participants considered it to have potential to be integrated as a tool for professionals.

CCS CONCEPTS

• **Human-centered computing** → HCI design and evaluation methods; • **Applied computing** → Health informatics.

KEYWORDS

Mental Health, Depressive Disorder, Large Language Models, Interactive Storytelling, Game

ACM Reference Format:

José Pedro Vieira Sousa, Pedro Campos, and Paulo Bala. 2024. College Tales: Pilot Study on Large Language Models Generated Narratives for Mental Health Literacy. In *Proceedings of the 27th International Academic Mindtrek Conference (Mindtrek '24)*, October 08–11, 2024, Tampere, Finland. ACM, New York, NY, USA, 6 pages. <https://doi.org/10.1145/3681716.3689447>

1 INTRODUCTION

Depressive disorders have seen an increase in incidence and severity, especially among young adults, who experience higher stress levels than older generations [2]. University students face unique situations and stressors (e.g. Academic Pressure, Financial Strain,

etc), that negatively impact their Mental Health (MH), with a 2021 study showing a 28% increase in depressive disorders over one year [27, 33]. Stigma and misinformation continue to limit access to MH services [28, 31]. Jorm et al. [19] defined Mental Health literacy (MHL) as the knowledge and attitudes related to MH that help in recognizing, managing and preventing MH problems. Intersecting MH with technology has the potential to create interventions for treatment, awareness, or prevention of MH conditions [5]. While existing work has focused on supporting existing MH practitioners [5, 11], recent studies explore alternative interventions using games [5, 9, 11] or Artificial Intelligence (AI) [4, 15, 17]. Though not yet clinically validated [5], these exploratory artefacts have expanded current intervention options; as such, this work engages with this design space of games, AI and MH. Games, especially narrative or storytelling games, often have well-defined and structured storylines (“handcrafted” by game designers or writers). Research on interactive storytelling has explored how AI, more specifically LLMs, can generate narratives and create dynamic experiences [4, 15, 17, 20, 26]. In this paper, we present a low-fidelity prototype using an LLM as a driver for a narrative game aimed at increasing literacy about depression. The game runs on ChatGPT (see appendix A), where it generates narratives through rules and guidelines, focusing on university students’ life events and stressors. Players choose actions as the character, exploring outcomes and enhancing their understanding of depression. Before conducting possible user studies, we playtested with five MH professionals to explore the potential of LLM-driven game interventions for health literacy. Our findings suggest that LLMs effectively create narratives for sensitive themes like depression, though they tend to be overly collaborative, which can limit narrative complexity [7]. These tools could provide MH professionals with additional ways to interact and gather information about a patient’s condition. The MH therapists indicated that this approach could be expanded to other MH disorders and topics beyond MH. Thus, this research may interest those involved in the design of gamified interventions and MH professionals using generative AI in their practice.

2 RELATED WORK

2.1 Stigma & Support Networks in Mental Health

Despite being recognized as a component of health for decades [32], MH is still stigmatized compared to physical health, with

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Mindtrek '24, October 08–11, 2024, Tampere, Finland

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ACM ISBN 979-8-4007-1823-6/24/10

<https://doi.org/10.1145/3681716.3689447>

conditions often perceived as controllable and the responsibility of the afflicted as opposed to physical conditions [10]. Link and Phelan [24] conceptualized stigma in four components, highlighting that it stems from societal values and generates discrimination and loss of reputation for those affected [18, 24].

Support networks (e.g., friends, family) significantly influence MH and help reduce stigma. These networks provide practical, tangible, or emotional support [1], which is crucial for mental well-being. A 2016 survey found that individuals with emotional support have lower stress levels [2]. However, the perception of support is essential, without it, the individual may not recognize the support they receive [13].

2.2 Games as Digital Health Interventions

Research at the intersection of MH and technology enables the development of scalable, on-demand, and affordable digital MH interventions [5]. These technologies can potentially reduce pressure on existing services, improve access, and enhance MHL for a broader audience. Various types of digital interventions have been identified, including Preventive, Supportive, Skills Training, and Gamified Interventions [12]. Among these, game-based interventions have gained attention as an alternative [5]. Newell et al. [25] reviewed nine studies on video game interventions, finding a broad demographic allure and symptom reduction. However, the duration of these effects remains uncertain [25]. Examples of such interventions include: “Ching Ching Story” [23], which effectively increased MHL; “EscapeCovid” [21], which enhanced user experience through co-creation, also improving the learning process and well being; “Stigma Stop” [8], which improved attitudes towards people with mental disorders; and “Moving Stories” [30], which reduced personal stigma but had no effect on literacy, perceived stigma, or social distance.

2.3 Conversational Agents and Prompt Engineering

Conversational agents (CAs) are AI-based programs that simulate human conversations [34]. Their use in several domains has increased, including MH [15], presenting possibilities for addressing problems associated with face-to-face interventions, such as price and possible consequences for the patient (stigma and discrimination). He et al. [15] reviewed 32 studies of CAs interventions for MH, with the results showing the importance of personalization and empathy for efficacy. Brookins and DeBacker [7] found that an LLM (GPT-3.5) tends to consider fairness and cooperation with higher frequency in comparison to humans. Similarly, Lee et al. [22] explored the effectiveness of an LLM in education through a debate game, identifying several requirements/criteria for implementation.

3 DESIGN OF COLLEGE TALES

Section 2.2 highlights the potential of digital interventions to support MH in various forms [12], specifically through game-based interventions [5, 9, 11]; while the clinical potential is promising, designing and evaluating this type of intervention is challenging [5]. Previous work [16] shows that digital interventions can successfully increase MHL including identifying symptoms and combating stigma. This study explores the use of LLMs to generate narratives

for game-based MH interventions, consulting therapists with psychology expertise. We designed College Tales, a prompt-based game prototype using ChatGPT (GPT 3.5) ¹ to create narratives that allow players to interact with stories about the struggles, symptoms, consequences and causes of depression in university students, while also being given choices that work as strategies (e.g. meditation, journaling, etc.). We chose the web version of ChatGPT (with GPT 3.5) due to its availability at the time of experiment; we acknowledge that newer models might result in improved narratives and game experience. The narrative rules and guidelines, based on Lee et al.’s method [22], include structured prompts for the game rules – prompts that define the structure of the game, such as the format of input and output and the number of scenes chosen considering the need to have a limit where the game could be done in a small frame of time but still be able to pass some knowledge to the player; and the narrative guidelines – prompts that define the narrative arc of the game, such as theme (depression), the characters that were chosen considering the immediate support network of a university student (parents, friends, college teacher and college therapist and the inner monologue created to give insight to the mind and feelings of the character. The prompts were designed over several iterations of trial and error in ChatGPT (GPT 3.5) and Meta Llama 2 [29], where in each iteration we verified if the generated narrative and game followed the narrative guidelines and game rules. For example, if the game did not follow a rule, then the specific rule would be adjusted to contain more or less information. Rules and guidelines (presented in Appendix A²) considered criteria from the “Diagnostic and Statistical Manual of Mental Disorders” (DSM-5) [3] and relevant literature to the target audience [2, 33, 34], as well as feedback from MH experts obtained through informal talks.

4 PILOT STUDY WITH EXPERTS

To address the ethical implications of testing the prototype, we consulted with five MH professionals with clinical and research experience in Psychology, to understand their interactions with this prototype and finetune the guidelines and rules. Participants were recruited using convenience sampling. Four participants were female; all participants had an educational background in Psychology and have practiced clinically, while also having experience in research. Participants were not monetarily compensated.

The study was conducted in individual sessions where participants were briefed on the study’s purpose and given the informed consent to be signed. Participants were given an explanation of the prototype (ChatGPT 3.5 interface, see fig. 1); after answering any doubts, the participants were given the prototype, with the same prompt, and asked to playtest it. Throughout the playtest, the researcher noted interactions and then conducted a semi-structured interview (see Appendix B) that addressed the prototype, the participant’s practice related to depression, and the rules and guidelines for the LLM. Data collected included the narrative generated during the playtest and transcribed interview audio. Participants are identified with the letter P and a sequential number. Thematic analysis was conducted using Taguette³, based on the approach described

¹<https://openai.com/>

²A playthrough using the low-fidelity prototype in ChatGPT is accessible [here](https://www.taguette.org/).

³<https://www.taguette.org/>

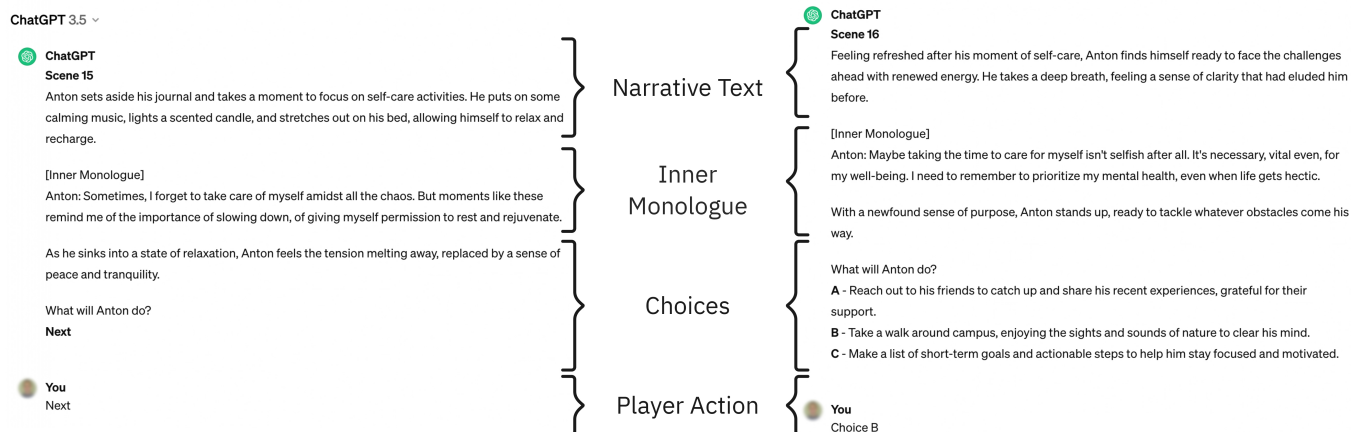


Figure 1: Two examples of scenes created by ChatGPT (3.5). Each scene (text and choice) is composed of narrative text, character's inner monologue, possible choices and the player action.

by Braun and Clarke [6]. Only one researcher coded the transcripts inductively, with the first and last authors reviewing themes and producing the results report.

5 FINDINGS

Through the thematic analysis of interview transcripts, we identified five high level themes.

5.1 Missing Information

Participants reported a common occurrence of the LLM failing to include relevant information essential for MHL. Common omissions included information about various symptoms, causes, and consequences of depression. For instance, P1 noted *"One thing that was missing is, in depression they don't even want to leave the house, they don't even want to get out of bed and they neglect their personal hygiene"*. P2 mentioned the lack of detailed symptoms *"Even in terms of symptoms, it's not showing that many symptoms"*. Additionally, the LLM did not adequately address the context of characters, such as P1's comment on absent parents influencing a young adult's depression (*"In the beginning, the description of the father and mother is that they were a little absent. This should have appeared in the monologue. [...] This is a young college student who is in early adulthood. [...] Most problems arise at that age. And a lot of it can have to do with absent parents."*).

5.2 Oversimplifying Depression

Participants indicated that the LLM narrative tends to oversimplify elements of depression (e.g. symptoms, consequences, recovery, etc.), presenting an overly positive and simplistic view. P1 remarked *"I think it has shown a very positive idea of what it is to deal with depression. It's much more dark than it is here and more complex"*. P2 added *"I think that in this part he might be soft, because in depression it's a little more severe. And there, he saw people, he saw colleagues, friends, groups and so on, he felt a little [alone] and then he went to talk. I chose the option of going to talk to friend one, and then he started to be integrated and always integrated from then on. And*

that's not actually how it happens in reality, is it? No matter how much I take these options, there are always internal dialogues that don't improve that much, no matter how much I take the attitude of going there to talk today, it doesn't mean that internally it will change that much."

Participants also stressed the importance of including complex topics like suicide, with P1 stating *"I think that by banning the word suicide, we are losing a lot here. Because in depression the risk of suicide is present. And that's one of the things it's important to inform people about. Because the severity increases with the risk of suicide."*

5.3 Misrepresenting Recovery

Participants reported that the narrative describes recovery as an overly positive single process, when in reality, recovery involves setbacks and comebacks (P2 *"Since it's so soft, [...] it is possible that it happens, but it has to happen after it is bad too, because it also happens and then being well again, because that's how it is [...]"*), and P4 *"Because this is never an immediate process, it takes its own time"*). The efficacy of solutions suggested by the LLM (e.g., journaling) can also mislead players on the gradual challenge of depression recovery, as a single solution tends to have immediate rewards in the story (P3 *"[...] it's not when you write for the first time that you get everything so when you start writing you have like a sense of okay, I'm not okay"*).

5.4 Impact of Support Networks in the Narrative

Participants provided feedback on the depiction of support networks and the narrative structure flow. They highlighted that the narrative could benefit from a more realistic portrayal of support networks, including the need for MHL among these networks. P1 suggested that informed support networks are crucial for helping individuals with depression (*"If the support network is informed, it will also help the person who is depressed to seek help. Because this is the obstacle"*). Participants also noted that every person, including those who may trigger problems, could play a role in the support network. P3 emphasized that *"I believe everyone can help. [...] The problem is, even the person who, that sometimes triggers these kind of*

things, can help. [...] Sometimes the families bring someone and say: hey! please, please, please help me because I don't know what to do. ". Regarding narrative structure, participants appreciated the general flow but pointed out some issues with repetitive elements and the final evaluation. P2 noted that the LLM sometimes created narrative loops, such as returning to the same physical location repeatedly: "So it was these situations, for example, after choosing an option and happened twice, or giving another different scenario and not going back three times to the dialogue room to discuss, for example, the subject". Additionally, P3 expressed dissatisfaction with the final evaluation, stating, "I reached the end and I have a good ending, at least as ChatGPT is saying. I don't think the same."

5.5 Potential for Mental Health Literacy

Participants recognized that the prototype could provide information about MH, despite its shortcomings. P3 mentioned that "[...] the prototype is good. I believe, if to be used as literacy for someone to learn more, the prototype could have after the last scene. Something like, like a few boxes for saying what the person should do in each answer [...]". They also saw the potential for these stories to resonate with university students and be incorporated into therapeutic practices. P3 suggested, ("Imagine in the future you have a first session and then you send this. And the patient will do this prior to the session. [...] I know where to start, because I can look at this topic and this answer to this and this question and this and this and this. I know how to, how to guide.").

6 DISCUSSION

Interviews revealed that LLM-generated games face limitations in supporting MHL due to constraints in the existing LLM's capabilities and design – (1) what type of information the LLM has access to and in what data was the LLM trained, (2) how it chooses to respond to player requests and (3) how creative it can be in establishing a narrative. Furthermore, LLM responses are conditioned to the rules and guidelines we have designed.

Feedback highlighted that the prototype often oversimplifies reality and misrepresents the recovery journey, possibly due to the LLM's tendency towards overly positive responses and the lack of explicit guidance on narrative complexity. For instance, the LLM's immediate positive framing of actions like journaling and absence of narrative friction, such as relapses or complex emotional states, contributed to an overly optimistic portrayal, possibly deriving from the fact that the LLM being used (ChatGPT) has been shown in previous research of serious games, to be fair and cooperative more frequently than humans [7]. Another cause possibly being derived from the rules and guidelines not explicitly stating how to evaluate or orient the narrative. Our rules and guidelines did not explicitly state to create friction (e.g., relapses in recovery journey, characters in the story that are triggering or do not know how to help the main character). As such, the lack of friction, aligned with a lack of understanding of the complexity of MH, can lead to an overly positive narrative. Participants highlighted that support networks, need to have enough literacy to be helpful and should involve a triage process to distinguish between social and therapeutic interactions. Participants also noted missing information about

MHL and inadequate narrative details. Although the prototype adhered to certain rules, deviations occurred in aspects like character names and the scene count. Suggestions for improvement include using a custom LLM with more comprehensive MH data (e.g., DSM-5 criteria [3]), incorporating narrative friction, and refining the rules and prompts to better guide the LLM's responses. Another suggestion is to modify the prompt engineering techniques (e.g. few-shot-prompting, etc.) and change the model hyperparameters as it may address some of these issues. By increasing the narrative's complexity and incorporating a broader range of MH information (general or related to depression), the prototype could provide a more accurate and supportive experience. However, these adjustments may not fully address the identified issues, as even with improved information, the LLM's cooperative nature could still lead to simplified outcomes.

7 FUTURE WORK, LIMITATIONS AND CONCLUSION

While the prototype provided relevant information and created a believable narrative, several limitations were identified: the small number of participants in the pilot test limits the generalizability of the findings, and the ChatGPT interface did not fully support narrative transportation [14]. This study highlights the potential of LLMs in generating narratives for MHL, particularly for depression. Despite its limitations, the prototype suggests that prompt gaming can be viable for serious health games. Designers should use clear guidelines, specific topic-related information, and advanced prompt engineering techniques like few-shot prompting. Our findings suggest that at the moment of the experiment, the current LLMs can be used to generate narratives for MHL, particularly for depression, although significant human oversight is needed to ensure accuracy, thus it may not be effective to create game interventions, where extensive information definition is needed to minimize issues, which can be costly in terms of human effort". As technology advances, LLMs could simplify narrative development in various industries, including gaming, and expand their use in personalized literacy tools. Future improvements will focus on enhancing narrative generation and incorporating visual elements from Generative AI for a more immersive experience.

ACKNOWLEDGMENTS

This research was funded by the Portuguese Recovery and Resilience Program (PRR), IAPMEI/ANI/FCT under Agenda no.26, C645022399-00000057 (eGamesLab). The authors would also like to acknowledge the Portuguese Foundation for Science and Technology, for projects 10.54499/LA/P/0083/2020; 10.54499/UIDP/50009/2020 & 10.54499/UIDB/50009/2020.

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A GAME RULES AND NARRATIVE GUIDELINES

- Rules:

- (1) There are two types of scenes, that are to be used:
 - Text Scenes: Present the story without choices, that continue the story until a new choice scene.
 - Choice Scenes: Offer a situation with three options for the player to choose from that can change the course of the rest of the story.
- (2) The narrative is generated based on the player's choices in the choice scenes.
- (3) Each scene is displayed individually. After each scene, the player provides the acceptable command to proceed.
- (4) The scenes feature an inner monologue by the main character, offering insight into their feelings before the player selects an option.
- (5) The player gives the main character a name and defines their gender in the first scene. Other character names are random.
- (6) Text and choices from previous scenes are saved but not displayed in subsequent scenes.
- (7) Players have four commands:
 - "Next": Progresses in text scenes.
 - "Choice \$": Used in choice scenes to select an option.
 - "Show": Displays all previous scenes in order.
 - "Continue": Resumes the game after displaying previous scenes.
- (8) Scenes are sequentially numbered for reference.
- (9) The game culminates in scene 20, this is a text scene, also providing an evaluation based on the main character's story and choices: "Good Ending," "Neutral Ending," or "Bad Ending."
- (10) Scenes are formatted as follows:
 - Text Scenes:
 - * **Scene**
 - * [Narrative Text]
 - * [Inner Monologue]
 - Choice Scenes:
 - * **Scene**
 - * [Narrative Text]
 - * [Inner Monologue]
 - * **A** - [Choice 1]
 - * **B** - [Choice 2]
 - * **C** - [Choice 3]
- Guidelines:
 - Setting - College
 - Theme - Depression
 - Theme Description - The story must make use of the depression symptoms and stigmas to tell a story that can show the player that the stigmas are false and increase the player's depression literacy, without being forcefully in showing the depression theme as it also needs to create a believable story of a college student.
 - Characters:
 - * Main Character (MC) - will be defined the genre and name by the player with no default;

- * MC Dad
- * MC Mom
- * MC Friend 1
- * MC Friend 2
- * MC Friend 3
- * College Teacher
- * College Therapist
- Topics that can't be used:
 - * Suicide

B SEMI-STRUCTURED INTERVIEW QUESTIONS

- About the prototype:
 - Was the prototype effective in presenting depression and the challenges associated with it, including symptoms identified in DSM-5?
 - Was the prototype effective in addressing the stigma surrounding depression?
 - Was the story believable regarding the topic of depression?
- About their practice:
 - Based on your clinical experience/training, what strategies or techniques would you apply to increase awareness and literacy about depression among patients?
 - Based on your clinical experience/training, what strategies or techniques would you apply to build/encourage support networks for patients?
- About the rules/guidelines:

(Give them the rules and guidelines, ask them to read them.)

 - Given your play experience and after reading them, how do you perceive the guidelines and rules given for the narrative?
 - Were there rules/guidelines that you feel were ignored? Are there rules/guidelines that should be present?
 - What recommendations would you make for refining or expanding the guidelines/rules?