Fusing Drama Therapy and Cognitive Behavioral Therapy in a Virtual Reality Setting: An Innovative Strategy for Tackling Maladaptive Lifestyle Habits

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ABSTRACT

This study delves into the integration of drama therapy within cognitive behavioral therapy (CBT) for young people, the system built in the VR environment, with the overarching objective of boosting their health consciousness and encouraging healthier lifestyle habits. Recognizing that trillions of cells within our bodies depend on us for survival, we propose that fostering a deep reverence for these cells can lead individuals to prioritize self-care. Our suggested VR-enhanced therapy incorporates a wearable device and panoramic animations, bridging elements from the respiratory, digestive, and cardiovascular systems into a immersive art therapeutic experience. The focus of this research is to examine the potential of VR-enhanced therapy to stimulate health consciousness and improve lifestyle habits. A pilot study was carried out to gauge the impact of this integrative approach on health awareness, revealing that participants' health consciousness was heightened through immersive engagement in the therapy process using the VR headset. This study offers a novel and promising perspective on the utilization of VR technology within the realm of drama therapy and cognitive behavioral therapy, underscoring its potential for significant positive influence on individuals' well-being.

CCS CONCEPTS

• **Applied computing → Health care information system**; • **Human-centered computing → Interactive system and tools**.

KEYWORDS

Virtual Reality, Drama therapy, Cognitive behavioral therapy, Health Awareness

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1 INTRODUCTION

In the quest to maintain overall health, the human body holds a remarkable capacity for self-healing. However, the frenzy of work and study often leaves young adults overlooking the vital need for consistent health preservation, giving precedence to their fleeting lifestyle [27]. Further, misconceptions and misinformation may cultivate negative attitudes and emotions toward health [29]. The engagement in harmful habits such as smoking, staying up late, and overeating can trigger severe diseases [19]. To address this predicament, there is a pressing need for innovative therapeutic interventions. Therefore, we propose the advancement of health awareness via a unique integration of drama therapy and cognitive behavioral therapy (CBT) in virtual reality (VR).

Cognitive Behavioral Therapy (CBT) is widely recognized for its effectiveness in rectifying detrimental habits, employing problem-solving and coping strategies rooted in relapse prevention theory, supplemented by cognitive restructuring [22]. Notably, combining CBT with drama therapy has shown enhanced outcomes in smoking cessation efforts, particularly in their early success rates [2]. However, this fusion poses challenges. Merging CBT with drama therapy often requires large venues for group activities, such as collective painting, driving up costs for materials, tools, and venue rentals [26]. Furthermore, the preference for individualized sessions complicates accessibility due to hesitations rooted in privacy concerns or therapy misconceptions [4]. Virtual Reality (VR) presents a solution to these challenges. VR introduces a revolutionary paradigm in mental health, mitigating issues of space and costs. Plus, VR's flexibility ensures personalized therapy experiences, on-demand, without the constraints of location or time.

Considering these profound benefits of VR, the article advocates for its integration with CBT and drama therapy. Envisage a therapeutic session within a VR environment where the narrative is meticulously crafted, drawing inspiration from CBT methodologies. Such an immersive experience is not just conceivable but might be the therapeutic future for newer generations, especially when new media, inclusive of VR, forms an integral fragment of their quotidian existence [20].

In light of these challenges, we introduce a pioneering solution:

- An Innovative Therapeutic Model: This paper underscores the elevation of health consciousness through an unprecedented fusion of drama therapy and cognitive behavioral therapy (CBT) harnessed within a virtual reality (VR) milieu.

- Blazing New Trails: While no prior work has ventured into integrating CBT and drama therapy within VR, our article

embarks on elucidating the tangible prospects of such a synthesis.

- VR's Transformative Power: By intertwining VR's immersive potential with the ingenuity inherent in drama therapy and the reflective depth of CBT, a game-changing therapeutic paradigm emerges.
- Alignment with Contemporary Lifestyles: For the newer generation, where innovative media, like VR, seamlessly integrate into their quotidian existence[20], channeling VR as the medium for therapeutic initiatives is a forward-thinking stride.

In essence, leveraging state-of-the-art platforms like VR as conduits for therapeutic interventions heralds the next frontier in holistic health approaches.

2 LITERATURE REVIEW

2.1 The convergence of Drama therapy and Cognitive Behavioral Therapy

Cognitive Behavioral Therapy (CBT) is a psychological intervention that operates on the premise of identifying and challenging an individual's negative thinking patterns to alter maladaptive behaviors and emotional responses [9]. This methodology has been extensively utilized in addressing a myriad of maladaptive habits and psychological disorders. For instance, CBT has been efficacious in assisting individuals to quit smoking, regulate alcohol, treat eating disorders, and manage anxiety-induced insomnia [22]. By concentrating on how individuals think (cognition) and how they act (behavior), CBT offers practical strategies for individuals to actively confront and reshape their undesirable habits.

Drama therapy is an artistic form of therapeutic intervention, leveraging drama techniques to help individuals explore, express, and process their emotional challenges [21]. Much like Cognitive Behavioral Therapy (CBT), drama therapy emphasizes the identification and challenging of negative thinking and behavioral patterns. Integrating drama therapy with CBT can offer a comprehensive approach to addressing maladaptive lifestyle habits. For instance, individuals can simulate new behavioral strategies in a safe dramatic setting, while concurrently utilizing CBT techniques to identify and reshape the negative cognitions. Such a synergistic approach can bolster motivation and confidence in individuals, making them more inclined to instigate lasting lifestyle changes. In particular, on the issue of smoking cessation, current studies have shown that the combination of CBT and drama therapy is better and faster than individual CBT treatment [2].

However, the integration of CBT and drama therapy isn't without challenges. Activities often demand larger spaces, resulting in higher costs from venue rentals and art materials. It can also be challenging to find therapists proficient in both therapies. Furthermore, privacy concerns or potential misunderstandings about this therapeutic blend might prevent some from pursuing it.

2.2 The benefits and potentials of VR

Simultaneously, Virtual Reality (VR) offers compelling solutions to these challenges. VR technology provides a decentralized approach to mental therapy, allowing patients to experience and manage their emotions in a simulated, secure environment without the constraints of a physical venue. This not only eliminates the need for expansive spaces but significantly cuts down on extra costs associated with art therapy. With just a VR headset, patients can undertake self-therapy sessions at home. Coupled with the flexibility of VR, therapy can be undertaken anytime, anywhere, making treatments more personalized, efficient, and economical. Hence, integrating VR as a therapeutic medium can not only address the limitations of CBT and drama therapy but also enhance the overall therapeutic experience.

In healthcare, VR has been used in exposure therapy, simulating anxiety-inducing scenarios like public speaking [23]. It aids in rehabilitation with interactive exercises for restoring motor functions [24]. VR educates patients about medical conditions and treatments [13]. It offers immersive artistic environments, combining visual, auditory, and haptic experiences, and provides a controlled space for exploring emotions and memories [8].

2.3 Unique Contributions and Novelty of Our Approach

Existing literature has increasingly recognized the potential of integrating VR with therapeutic methods, especially with CBT. When augmented by VR, CBT sessions have evidenced enhanced patient engagement, providing a more immersive feedback system and individually tailored therapeutic experiences [6]. Yet, when it comes to drama therapy, its inherent expressive attributes, which seem perfectly poised for the expansive realms of VR, have not been explored in tandem with virtual environments. This gap presents a significant oversight, given the potential for participants to design, adapt, and delve into scenarios within VR, facilitating experiences that might be challenging to replicate in traditional settings.

Our research carves out a unique niche in this landscape. We embark on an avant-garde journey to seamlessly blend VR, CBT, and drama therapy. While intersections between CBT and VR have been touched upon in the academic sphere, the convergence of drama therapy and VR remains an uncharted domain. Our triadic approach not only seeks to tap into the individual strengths of each method but aims to unlock synergies previously unattainable. We posit that this groundbreaking fusion will craft a therapeutic paradigm that's more holistic, immersive, and impactful than any of its individual components. Beyond just immediate therapeutic outcomes, our investigation strives to pave the way for future explorations, emphasizing the urgency for innovative, multifaceted, and patient-centric therapeutic solutions in an era that's swiftly embracing the digital frontier.

3 SYSTEM DESIGN

This study's design intention revolves around leveraging VR experiences to augment the efficacy of drama therapy and CBT, raising awareness among new generations about daily health management of the body system. We aim to craft a soothing, immersive VR experience that guides users through various human body systems, incorporating VR controller interaction and multi-sensory feedback. Explores the theoretical and practical aspects of "transformations," an improvisational technique in drama therapy. Scenes shift swiftly, one after the other, aiming for a fluid continuity where imagery

continually evolves [11]. Participants will enter the world of a certain organ and have a dialogue with their own organ. There is also an AI role-playing "time guide" who guides the participants. The script was designed using behavioral cognitive therapy.

3.1 Scenario 1 - Past Review

Participants are taken to the moment when they first tried a bad habit, such as smoking. Time Guide encourages participants to observe themselves at that moment and explore why and how they felt when they decided to try the habit. This scenario uses the "situational analysis" in CBT [3]. Situational analysis is the in-depth study of thinking, emotional and behavioral responses in a given situation. By recalling the moment when they first tried a bad habit, participants could recognize the original intention or driver that led to the bad habit.

3.2 Scenario 2 - Recognition of negative thinking

A time guide takes participants to a series of important moments related to bad habits. At each moment, participants were encouraged to identify any negative or distorted thinking associated with the habit. This is a core part of CBT, which is identifying automatic thoughts. Automatic thoughts are thoughts or images that arise automatically without judgment, usually negative, such as "I can't do this" or "I'm not good enough [14]." In this scenario, participants were encouraged to recognize these negative thoughts and consider how they affected their behavior.

3.3 Scenario 3 - Challenges and Alternatives

Time Guide helps participants review and challenge these negative thoughts. Participants were encouraged to consider alternative, healthier thinking patterns and behavioral responses. In CBT, once a negative automatic thought is identified, the next step is to challenge it and find more realistic, positive alternatives [7]. In this scenario, the time guide acts as a therapist, helping participants challenge their negative thinking and offering alternative perspectives.

3.4 Scenario 4 - Future Outlook

Participants are transported to a future time where they do not have this bad habit. Here, they can see themselves healthier and happier and feel the positive effects of not having the habit. This scenario encourages "positive imagery," a strategy used in CBT to help people imagine a future that is positive and free of bad habits [10]. This can help boost participants' motivation and provide them with a clear goal.

3.5 Scenario 5 - End Stage

Return to the original safe space for a concluding discussion with the Time Wizard. Time Wizard encourages participants to develop a practical action plan to help them quit this bad habit in real life. The purpose of this VR script is to help participants identify, challenge and replace negative thinking associated with bad habits [25]. In an immersive VR environment, they can experience and reflect on their thinking and behavior patterns more deeply, and find healthier
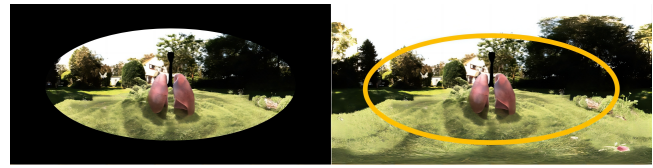

Figure 1: Normal restricted field of view and the view after improvement which can reduce cybersickness.

alternatives with the guidance of a mentor or therapist. In the wrap-up discussion, the time guide encourages participants to develop a realistic plan of action. This is similar to "behavioral experiments" or "homework" in CBT, where the therapist encourages the patient to perform specific behavioral or thought experiments outside of therapy to reinforce skills learned in therapy.

Overall, time guides support and challenge participants, helping participants to make conscious decisions through the process of reviewing, identifying, challenging and imagining. By introducing organ as a visual and emotive character into the VR script, we can provide participants with a more visual representation of the consequences of bad habits, making the motivation to adapt a healthier lifestyle stronger.

The VR experience heightens users' health awareness through its immersive interactivity. The system gives users a choice: continue harmful behaviors and face a vivid, anime-style outcome, or choose healthier actions to reduce bodily stress. This ironic twist serves as a dramatic attention grabber and underscores the resilience of the human body, promoting a greater appreciation of its workings and the impacts of bad health habits.

4 IMPLEMENTATION

4.1 Vision - VR animation design

The VR experience we've created incorporates vivid animations depicting the respiratory, digestive, and cardiovascular systems. Each scene delves into specific health issues and, to maintain scientific accuracy, draws inspiration from authentic experimental images.

To enrich the VR viewing experience, we've implemented a technique known as field of view (FOV) restriction. Traditional FOV restriction often turns the peripheral view black, limiting visibility to the center. In our approach, we've optimized this by focusing animations solely at the center of the view, leaving the corner scenes static but visible. This partial occlusion via a vignette effect helps mitigate cybersickness during continuous VR movement [1]. The FOV before and after improvement is shown in Figure 1.

4.2 Haptics - Wearable device Design

Our chosen wearable device for this study is a smart glove endowed with vibration, heat, and shrinking capabilities, as demonstrated in Figure 2. The glove simulates sensations mirroring the experience of lungs breathing on grass, erupting heart volcanoes, and the stretching and shattering of the stomach. Within the VR framework, the glove acts as a health monitor, enabling users to make informed decisions about potentially harmful activities.
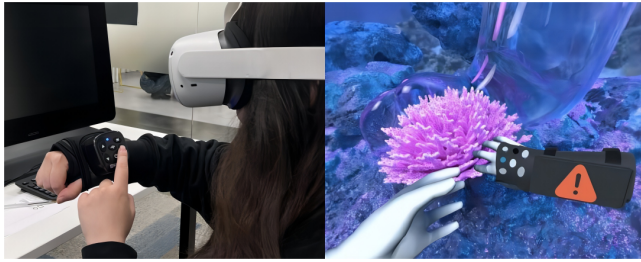
Figure 2: Linkage between wearable device and model in VR experience.

4.3 Auditory - Sound Design

Drama therapy often utilizes meditation techniques. In pursuit of promoting a serene atmosphere, we've crafted a meditative audio track that encompasses sound effects like fire crackling, waves crashing, grass rustling, and synchronized sounds of breaths, digestion, and heartbeats with the VR visuals. We encourage participants to use a stethoscope at the start of the experience to listen to their own bodily sounds, incorporating personal auditory signals into the sound design, fostering an immersive, meditative, and personalized experience, as shown in Figure 3. The incorporation of meditation elements can relax neural pathways, enhance the soothing effects of audio-visual components, and guide viewers toward introspection [12].

Figure 3: Stethoscope and audience doing calm down stage of meditation.

5 EVALUATION

After consulting with a certified art therapy practitioners and a HCI (Human Computer Interaction) experts, I garnered invaluable insights and affirmations concerning the proposed therapeutic approach.

5.1 Expert Feedback

The art therapy specialist was notably impressed by the script design that incorporates the cognitive behavioral therapy theory. This theory has been widely adopted in treating various mental conditions, such as smoking cessation, alcohol abstinence, and sleep regulation, among others, effectively producing calming emotional effects. She explained that drama therapy is an artistic form of healing that enables the audience to engage in role-playing, immersing themselves in diverse life scenarios. This immersion promotes empathy and a comprehensive exploration of their own life experiences.

The HCI expert praised the harmonious integration of VR technology with drama therapy. While traditional psychological counseling can be challenging to access and often costly, VR offers a more affordable and flexible alternative. This technology democratizes art therapy, obviating the need for large, dedicated spaces and extensive setup time. He was particularly struck by the evocative visuals of VR, opining that they could elicit potent emotional reactions, a crucial aspect of therapeutic processes.

Both professionals acknowledged the tremendous potential of amalgamating their respective methods. They underscored the distinct advantages each method offers and were enthusiastic about their combined potential. Both believe that, if adeptly implemented, this integrated approach could significantly enhance therapeutic experiences and outcomes for a broad spectrum of individuals.

5.2 Methodology and Participant Details

Participants were recruited from universities, community workshops, and public ads. They attended a briefing about the study's aims and methods. Those interested were screened based on criteria: engagement in an unhealthy habit, aged 20-30, limited VR experience, and no severe motion sickness history. Out of 40 respondents, 13 met these criteria. These participants familiarized themselves with the VR equipment and environment. The VR sessions, lasting around 5 minutes, showcased health habits and outcomes. The Royal College of Art Ethics Review Committee approved the study, and all participants gave written consent.

5.3 Data Collection

Data collection for this study incorporated three main avenues:

1) pre-experimental Montreal Cognitive Assessment Test (MoCA) scores: This established cognitive baselines.

2) Video Recordings: To chronicle real-time reactions during the VR sessions.

3) Post-Experiment Questionnaires: Designed to probe deeper into the participants' experiences. The questionnaire comprised:

Section A: VR Experience Ratings (On a scale of 1-5, with 5 being extremely positive) Immersiveness of the VR content Clarity of health messages conveyed Emotional impact

Section B: Open-ended Questions Describe a particular moment in the VR experience that stood out. How has this session influenced your perception of your health habits? What improvements would enhance the VR experience for you?

Section C: Health Consciousness Shift Post-VR, how likely are you to make positive changes to your health habits? (Scale of 1-5)

5.4 Data Processing and Analysis

Correlation analysis revealed no significant relationship between MoCA scores and participants' age or gender, indicating negligible individual differences within the young adult sample [28].
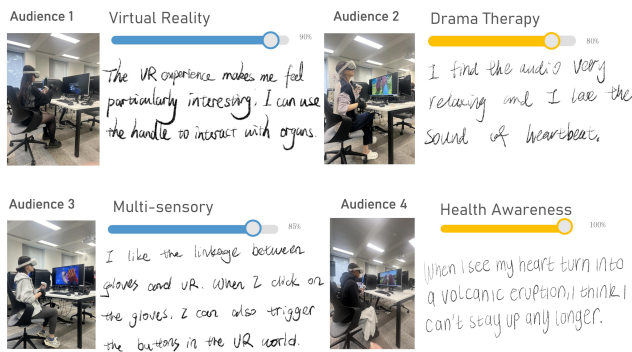
Figure 4: Audiences experience process and their feedback.

Video recordings were processed using qualitative content analysis. Two independent coders highlighted instances of visible emotional responses, engagement levels, and specific interactions. Instances of coder disagreement were addressed in joint review sessions, ensuring consistent interpretations.

Quantitative data from Section A and C underwent statistical analyses, specifically looking for mean scores and significant deviations. Responses from Section B were processed using thematic analysis, identifying and categorizing recurring themes or sentiments.

5.5 Results and Observations

All participants completed the VR experience successfully. Notable observations included participants T3, T6, and T13 swaying and humming along with the audio. T8 and T10 expressed their enjoyment of the unique interactions with body organs. T11 requested a break due to headset weight, while T7 noted the remarkable connection between the real glove and the VR health monitoring glove. T5 was particularly impressed by the graphics depicting the cardiovascular system. T2 was initially skeptical, she admitted that the VR world made her face some uncomfortable truths about her health and choices. The vivid imagery of deteriorating lungs and the dramatic representation of her health journey was a wake-up call. T10 praised The design of a calming VR space or "safe zone" where users can retreat if the experience becomes too intense can provide a safety net. But some participants mentioned system delays during transitions between different body systems. Four of audiences hand-writing feedback are shown in Figure 4.

In our user feedback questionnaire involving 13 participants, we observed a range of responses. The immersiveness of the VR experience was generally rated highly, with a majority of participants scoring it 4 or above on a scale of 1 to 5. Clarity of the health messages conveyed saw mixed feedback, ranging from scores of 2 to 5, suggesting some areas for improvement. Emotional impact elicited strong reactions in most participants, with many rating it at 4 or 5. Lastly, the likelihood of participants to make positive health changes after the VR experience was encouraging, with over half of the participants scoring it 4 or 5. This indicates the potential effectiveness of the VR tool in fostering health awareness and promoting behavioral change. The statistical results are shown in Figure 5.
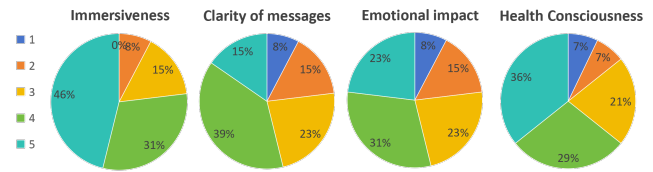

Figure 5: Questionnaire statistics results

Overall, the feedback suggests the VR experience has potential in augmenting drama therapy and fostering health awareness. This study gives a glimpse into the capabilities of VR in drama therapy, particularly for young adults with unhealthy lifestyle habits.

6 CONCLUSION

The VR experience discussed in this paper represents a unique amalgamation of medical insights, immersive audiovisual elements, personalized body signals, and a wearable device. This research notably contributes to the domain of CBT and drama therapy by unveiling the possibilities of VR experiences for fostering health consciousness. It efficaciously bridges the spheres of drama therapy, CBT, technology, and health, offering critical insights for designing interactive interventions aimed at enhancing well-being. The outcomes of this study hold the potential to propel the field forward and inspire additional research into interactive methodologies for therapeutic purposes.

During the research, several challenges arose: (1) Navigational Disorientation: The VR's panoramic view can disorient users. Addressing this could involve sound positioning technology [15]. (2) Transitioning Complexity: Switching between VR systems might confuse users. A multi-window VR system offering smooth transitions may be a solution [5]. (3) Insufficient haptic feedback: The current device provides ffers only basic haptic feedback capabilities. ILeveraging innovative tangible [17, 18] and robotic [16] technology could enhance the haptic feedback, elevating the overall immersive experience.

Going forward, the iterative design process will be utilized to examine additional themes and accommodate varying user demographics, including the elderly and children. This will help further refine the therapeutic benefits of the VR experience in drama therapy. Additionally, it is the author's intent to establish guidelines for designing VR content specifically for drama therapy and CBT, inviting more designers and VR engineers to make significant contributions to the field. This study could substantially influence the domain of health and well-being by furnishing empirical evidence for the efficacy of VR experiences as drama therapy interventions.

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