Endless Row - A therapeutic game for stress relief

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***Abstract*— The rise of stress and anxiety in modern society has led to an increased demand for therapeutic solutions beyond traditional methods. Video games, typically viewed as recreational or entertainment activities, have begun to show promise as therapeutic tools. "Endless Row," a therapeutic boat-rowing game, seeks to provide players with an immersive, calming experience designed to alleviate stress and tension. Through its serene gameplay mechanics, picturesque landscapes, and soothing auditory environment, "Endless Row" aims to induce a state of relaxation, mindfulness, and mental clarity. This paper explores the potential benefits of "Endless Row" on individuals experiencing stress, examining the psychological and physiological impact of immersive gaming in stress management. The findings could shed light on how video games like "Endless Row" can serve as complementary tools for emotional well-being and mental health.**

Keywords— Therapeutic Video Games, Stress and Anxiety, Immersive Gameplay, Psychological and Physiological Impact: Digital Therapeutics, Game Design Elements, Performance Evaluation, User Feedback and Improvement

I. INTRODUCTION

In today's fast-paced world, stress and tension have become pervasive, affecting individuals across all age groups and occupations. Chronic stress has been linked to various physical and mental health issues, including cardiovascular diseases, depression, and anxiety disorders. Traditional therapeutic approaches such as meditation, exercise, and counseling are effective but may not be accessible or appealing to all individuals. The growing field of digital therapeutics, particularly through video games, offers an innovative and engaging alternative to traditional methods of stress relief.

"Endless Row" is designed as a therapeutic tool that leverages the immersive nature of video games to promote mental relaxation. The game places players in a tranquil, endless stream of water, surrounded by breathtaking landscapes, including tall mountains, forests, and waterfalls. The calming visual design, paired with gentle, ambient sounds, encourages players to disconnect from their stressors and focus on the peaceful experience at hand.

This paper aims to investigate how "Endless Row" can be used to combat stress, examining its potential to evoke positive emotional states and reduce tension through the concept of immersive gameplay.

II. LITERATURE REVIEW

First, In recent years, the potential of video games as tools for managing stress and anxiety has gained considerable academic attention. A growing body of research highlights that video games, particularly those designed with relaxation and immersion in mind, can serve as effective mediums for reducing stress. The psychological benefits of video games, such as their ability to improve mood and provide emotional relief, are increasingly being recognized in both therapeutic and recreational contexts.

One of the foundational studies in this area, conducted by Russoniello et al. (2009) [3], revealed that casual video games could reduce physiological markers of stress, such as heart rate and cortisol levels. The study examined the effects of playing casual games like Bejeweled and found that participants who engaged with these games experienced significant reductions in stress compared to control groups involved in traditional relaxation techniques. This supports the idea that certain types of games can offer players a therapeutic outlet to unwind from the pressures of daily life. [5]

In addition to physiological benefits, other studies have focused on the emotional and psychological aspects of stress relief through video gaming. Reinecke (2009) [2] explored the concept of "recovery experiences" in video games, suggesting that games allow players to mentally disengage from stressful situations, providing both relaxation and entertainment. These recovery experiences align closely with the theoretical frameworks of escapism and flow, where the immersive nature of the gameplay helps players focus their attention away from negative emotions. [5]

However, the benefits of gaming are not universal across all genres. Research indicates that the content and nature of the game play a significant role in determining whether stress is alleviated or exacerbated. For example, while puzzle and casual games have shown positive effects, action and fighting games, particularly those involving violent content, have been found to induce stress. Studies comparing games like Tetris and Mortal Kombat have shown that participants in violent games displayed elevated heart rate and emotional distress compared to those playing puzzle games. [6] This underscores the need for careful consideration of game design when exploring the therapeutic potential of video games.

Another angle of investigation is how video games compare to other forms of therapeutic interventions, such as mindfulness and meditation. In a study by Fish et al. (2014) [1], the stress-reducing effects of playing a game called Flower were compared to traditional mindfulness meditation. Results showed that playing the game was just as effective as meditation in reducing stress and improving mood, highlighting that video games could be a more engaging alternative to traditional stress-relief practices for certain individuals [5][6].

These findings suggest that video games, particularly those designed with non-violent, calming, and immersive elements, can serve as valuable tools in managing stress. Games like "Endless Row," which feature soothing visuals and simple mechanics, align with this body of research, providing players with a therapeutic escape. Future research could explore how the specific design elements of such games—like audio-visual environments and interaction simplicity—can optimize their stress-reducing benefits.

III. PERFORMANCE EVALUATION

To evaluate the effectiveness of Endless Row on stress reduction, several performance metrics based on physiological, emotional, and psychological responses can be

applied. Drawing from existing research on therapeutic video games, here are the metrics that could be useful for your game;.

A. *Emotional Response Metrics*

Define Self-Reported Emotional State:

Players can be asked to report their mood and emotional state using scales such as the Positive and Negative Affect Schedule (PANAS). This survey helps capture changes in positive and negative emotions before and after playing the game, offering insights into its emotional impact.

Stress Appraisal Measures:

Using scales like the Perceived Stress Scale (PSS) or the State-Trait Anxiety Inventory (STAI), you can gather subjective data on how stressful or relaxing the game experience was for the player. A decrease in stress scores would suggest that the game alleviates tension.

B. *Psychological Engagement and Flow*

Flow State Scale:

You could measure the extent to which players experience a flow state—complete absorption in the game that helps them forget their stressors. The Flow State Scale (FSS) or similar instruments can be used to quantify this immersive experience, which is critical for stress relief.

C. *Gameplay Behavioral Metrics*

Time Spent in Calming Sections:

Track the time players spend in specific game environments designed for relaxation, such as when they row through serene landscapes or focus on the soothing soundscapes.

Interaction Patterns:

Analyze player behavior such as rowing speed and frequency of stops. Slower, more relaxed interactions with the game could indicate a calming effect, while erratic or rushed behavior might suggest lingering stress or agitation.

D. *Post-Gameplay Feedback*

Qualitative Surveys and Interviews:

After the game session, players can provide open-ended feedback on their experience. Questions could explore their perceived stress levels, how relaxed they felt, and which aspects of the game were most effective in reducing their tension.

Game Experience Questionnaire:

This standardized questionnaire assesses user experience across various dimensions, including immersion, competence, and tension. The "tension" subscale, in particular, can help measure whether players feel less tense after playing Endless Row.

IV. PROPOSED METHODOLOGY

A. *Tools and Software*

Unity will be used as the primary game engine, with Blender for modeling and Adobe Photoshop for texture design. Unity's C# scripting will be used for game mechanics.

B. *Map Design*

- Kumbalangi Days: A lush, tropical environment with palm trees and slow-moving waters, designed to evoke feelings of warmth and serenity.
- Snowy Alps: An alpine landscape with calm, cold waters and snow-covered mountains, creating a peaceful winter atmosphere.

C. *Boat Functionalities:*

The boat-rowing mechanics will focus on slow, smooth movements, allowing for ease of control. Speed and direction are adjustable by the player to promote relaxation.

D. *Visual Effectses:*

Special attention has been given to ensure beautiful, serene visuals such as reflections on the water, gentle light scattering, and ambient weather effects like snowfall or sunsets.

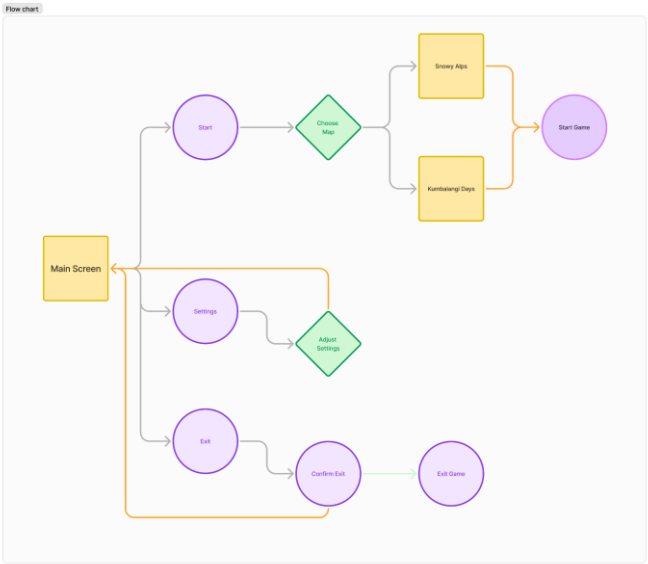
E. *Audio:*

A carefully selected ambient soundscape will be integrated into each map. Kumbalangi Days will feature soft wind and distant bird calls while Snowy Alps will have soft breezes and crunching snow.

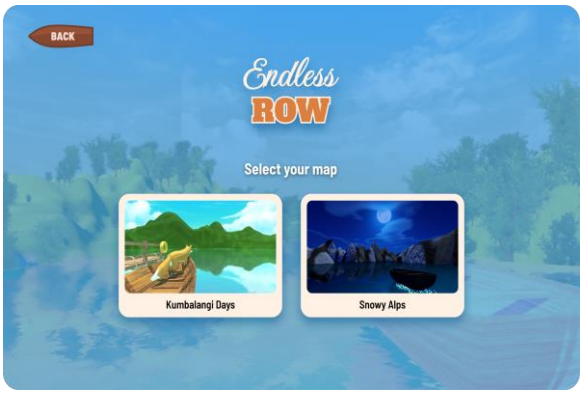
Boat Functionalities:

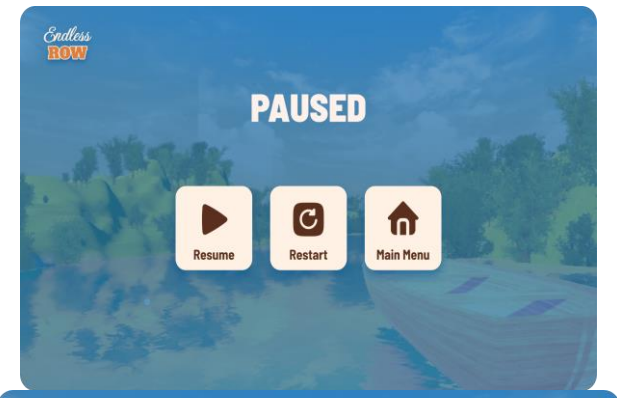
The boat-rowing mechanics will focus on slow, smooth movements, allowing for ease of control. Speed and direction are adjustable by the player to promote relaxation.

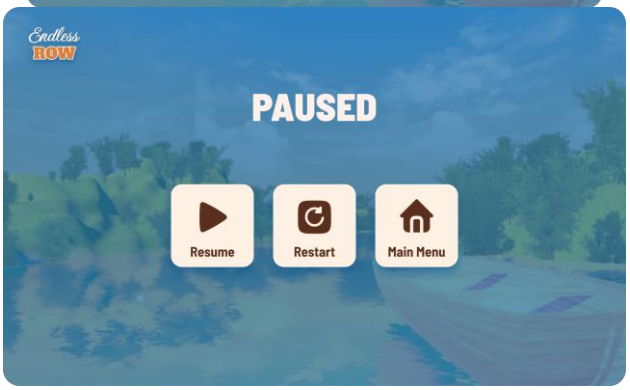
V. ARCHITECTURE DIAGRAM



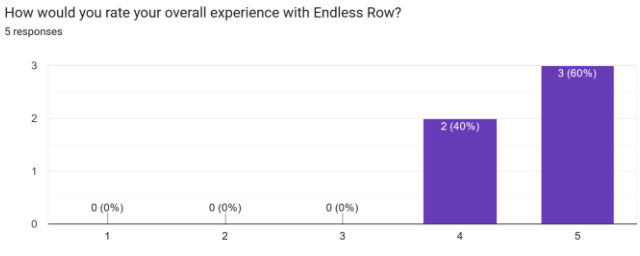
VI. GAME MECHANICS

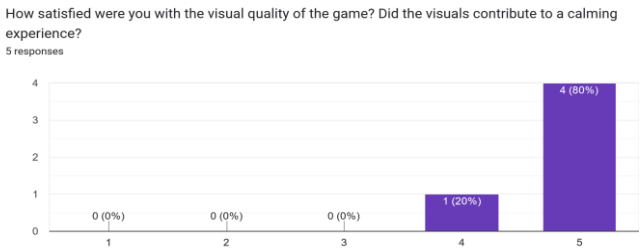


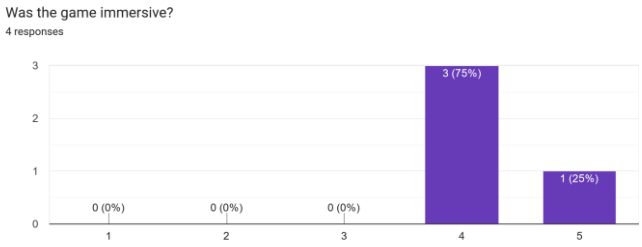


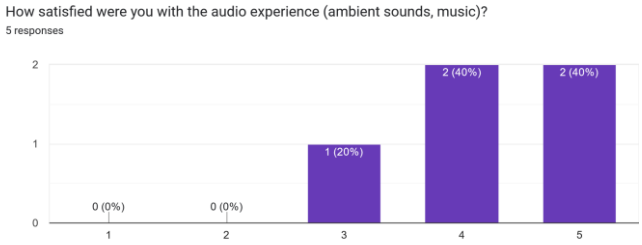


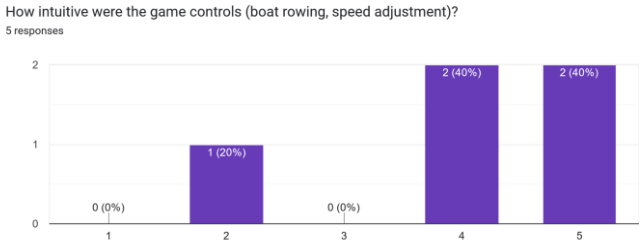
VII. DATA ANALYTICS

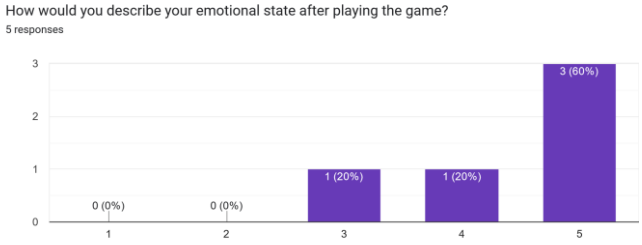












Which features or elements could be improved to enhance relaxation?

4 responses,

Respondent A: The kumbalangi days map was good and relaxing. The night map player boat experience could have been improved by adjusting the boat speed and flow by adjusting the smoothness of the flow. Overall, the experience was good, and it had great impact in overall mental peace and had a relaxing effect

Respondent B: It was just perfect

Respondent C: No changes (Onum venda)

Respondent D: Needs more maps and audio choices. Needs to have a storyline to make it more engaging and immersive. Add collectibles

Respondent E: A visual storyline could've helped make my mind occupied with the game. The visuals were very pleasing, and the audio track helped in making a change in the emotional state. Additionally, there's scope for improvement in the controls of the game.

VIII. Results

1. Overall Experience

○ Players generally reported a positive experience, describing Endless Row as visually appealing with clean and serene landscapes. Most found it calming and stress-relieving, while a few felt it had minimal impact on their mood.

2. Visual & Audio Experience

○ Visuals: The game's visuals received praise for their aesthetic quality. Players specifically mentioned the Kumbalangi Days map as being particularly relaxing. However, some suggested that the game could be more immersive with smoother animations, especially in night maps, to improve flow and boat experience.

○ Audio: While the background music was well-received, players felt that adding more ambient sounds (e.g., boat splashing, birds chirping, wind) would enhance immersion.

IX. Conclusion

Strengths: Endless Row effectively provides a stress-relieving experience with pleasing visuals and ambient background audio.

Areas for Improvement:

● Enhanced Immersion: Add ambient sounds such as water splashes, bird chirps, and wind to deepen the sensory experience.

● Gameplay Expansion: Introduce additional maps, collectibles, and a simple storyline to increase engagement.

● Control Flexibility: Allow more options for boat movement, including speed adjustments, for a personalized player experience.

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