

# Supernova: Exploring Interactive Game Design to Support Movement Quality in Physical Therapy Recovery

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Figure 1. *Supernova* Visual Aesthetic

## **Keywords:**

Movement Experience, Physical Therapy, Kinesthetic Games, Aesthetic Visualization

## **Abstract:**

Physical Therapy focuses on the attainment of movement goals through a process of exercises targeted to a specific anatomical action. While patients are personally engaged in their recovery process, there is often a lack of external motivation to support their experience. Interactive technologies such as virtual reality have been explored in the domain of physical therapy, however these studies continue to be few and lack understanding of qualitative movement experience. Our project explores how aesthetic and interactive movement games can support physical therapy patient motivation, discipline and goal attainment. We have created an interactive game for child participants that focus on the quality of the movement activity within aesthetically provocative visuals of flying through space (see Figure 1). Games, visuals and interaction choices were specifically designed to support the experience of movement quality in exercise performance.

The quality of movement experience can be imperative to a physical therapy patient's recovery. While the experience of moving is often restricted to the physical actions determined for the patient's personal needs, the addition of external motivation such as interactive movement games can support the quality of the recovery experience. We ask the question, 'how can interactive art games support a patient's recovery process by focusing on quality of movement performance, enjoyment and engagement?' This project highlights two gaps in current game and health research to support patient experience: 1) there is a lack of tailor-made games that support the patient's experience of moving and 2) there is a lack of qualitative data around patient experience to identify parameters of motivation and engagement.

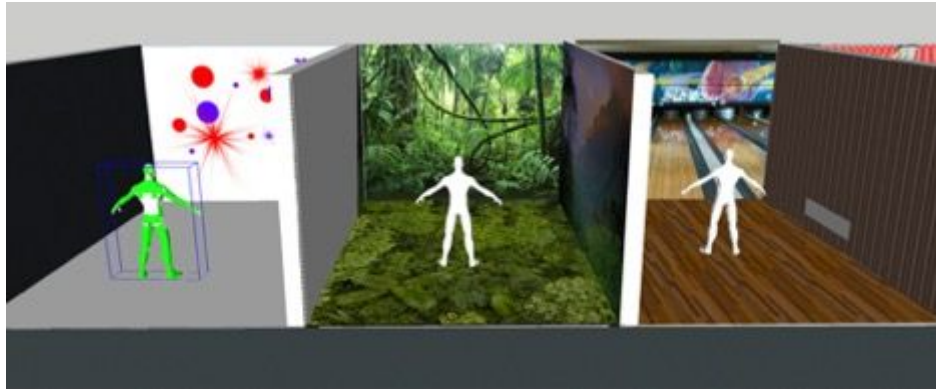


Figure 2. Future User Scenarios

While research has been performed by exploring technology-based games in healthcare, there continues to be a lack of tailor-made games available that target the patient's experience of moving (Chang et al, 2011; Merians et al, 2006; Wille et al, 2011). Phenomenological interviewing techniques developed by cognitive scientists Varela, Vermeusch, Depraz and Petitmengin are used to access patient's descriptions of lived experience (Depraz et al, 2003; Petitmengin, 2006). We use Laban Movement Analysis as a framework in which to describe quality of movement (Cox and Studd, 2014).

*Supernova* challenges players to use the correct quality of movement as they complete specific tasks in space. Players are required to gather atmospheric energy from stars by using quick, light and indirect 'flick' gestures as they are flying through space. Sustained, light and indirect 'float' gestures are used to guide asteroids away. Sustained, strong and direct 'press' gestures are used to create Supernovas. Players navigate by moving their arms in particular spatial quadrants. Raised right arm moves forward and turns right, while a lowered left arm moves backward and turns right. To move forward the player extends arms away from the body. Future developments ideas include user scenarios such as popping bubbles, swinging on vines and bowling (see Figure 2). This experience of attending to movement quality in an interactive game challenges patients to think differently about the way they move, and the level of control and responsibility they have to their own bodies in recovery.

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### **Biographies:**

Kristin Carlson is an Assistant Professor in the Arts Technology Program at Illinois State University. She researches the role that computation can play in movement and creative process and designs systems for embodied engagement. She has a background in choreography computation and is a PhD Candidate at The School for Interactive Arts and Technology at Simon Fraser University.

Kimberly Hobby is an Arts Technology graduate student at Illinois State University. She received her Bachelor's Degree in Visual Art at the University of Illinois at Springfield. Her current research interests include color theory, design aesthetics, and game implementation.