

Digital Media
Hochschule für Künste Bremen

SIMULATING ORDINARY DREAMING AND LUCID DREAMING IN VR

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Abstract

This project explores the potential of virtual reality (VR) technology to help people understand and distinguish lucid dreams from ordinary dreams. While lucid dreaming is an effective treatment for nightmares, achieving it can be challenging and requires extensive training. Through an interactive VR experience, this study aims to provide participants with an immersive and realistic environment to experience lucid and ordinary dreams. Interviews with experienced lucid dreamers, dream creation in VR and hand tracking with Meta quest2 were used to measure the effectiveness of VR in improving participants' understanding of lucid dreams and participants' understanding of the differences between lucid and ordinary dreams. This study aimed to investigate whether VR can help people immerse themselves in lucid dreams and develop an interest in lucid dreaming and potentially increase its use as a lucid dream therapy.



Fundamentals

Dreams have held an enduring fascination throughout human history, serving as a bridge between the realms of the real and the surreal. Before the scientific interpretation of dreams, they were seen as messages from the divine, influencing religion and worship across various cultures. The earliest dream books, such as the Akkadian Dream Book from Mesopotamia and the Assyrian Dream Book, showcased the significance of dreams, often focusing on the dreams of kings and priests. Dreams were considered a conduit for divine revelation, shaping belief systems and guiding societal decisions.

In ancient China, dreams were also a realm of intrigue. The Zhou Yi, an early Chinese text, delved into dream interpretations, associating them with symbols like fish that carried notions of prosperity and luck. The Interpretation of Dreams by the Duke of Zhou further refined this concept, establishing connections between dream symbols and real-life outcomes. Across different cultures, dreams served as a pathway to understanding fate, providing insights into future events.

Aristotle introduced a scientific perspective on dreams by explaining them as physiological phenomena. He viewed dreams as the result of the body's changing states due to illness or stimulation, highlighting the link between dreams and physical well-being. This marked a significant shift from mystical interpretations toward a more empirical understanding of dreams.

Freud's work marked a turning point in the study of dreams, integrating psychological analysis. He explored the complexities of dream interpretation, focusing on the unconscious mind's influence on dreams. Freud's "The Interpretation of Dreams" proposed that dreams are shaped by repressed desires and experiences. His theory introduced the concept of the unconscious mind influencing dream content through processes like displacement, substitution, and symbolization. Freud's approach contributed to a deeper understanding of the intricate interplay between dreams and the human psyche.

Lucid dreaming and conscious mind in sleep

The term "lucid dreaming" was first used by Frederik van Eeden in 1913. Van Eeden was a Dutch psychologist and writer. He classified dreams into nine types, the seventh type being lucid dreaming. In lucid dreaming, the dreamer is aware that he is dreaming and can influence the action of the dream. Van Eeden believed that lucid dreams were symbolic and stemmed from real life events.

Van Eeden had a lucid dream in which he attempted to break a glass bottle in the dream and eventually succeeded. He did not consider such dreams as hallucinations, but as conscious experiences. He even believed that dreams could predict the future, as in a dream in which he foresaw bankruptcy.

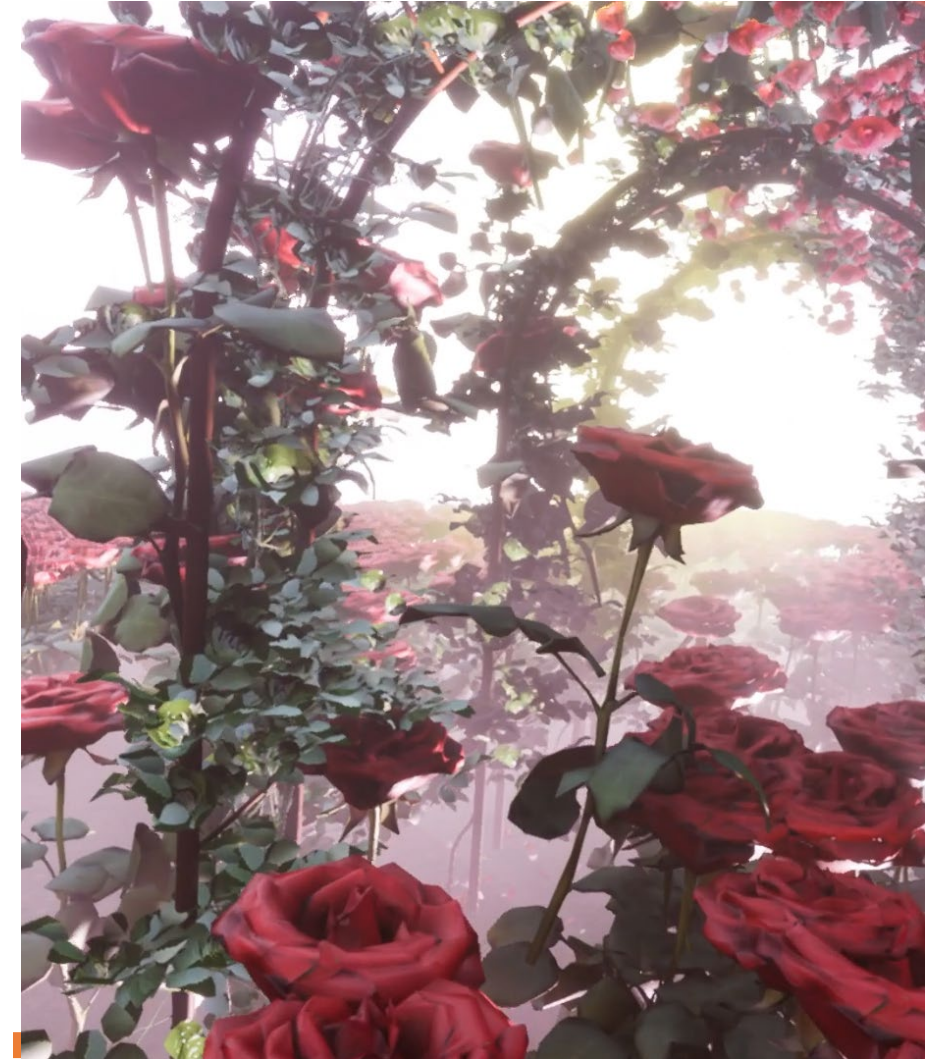
In the 21st century, scientists view lucid dreams from a scientific perspective rather than as mysterious messages. In lucid dreams, the dreamer is conscious during sleep and floats in his own inner dream universe. This is considered paradoxical because the body is externally asleep while the conscious mind is awake.

Modern studies use techniques such as electroencephalography (EEG) and neuroimaging to examine brain activity during sleep and identify the differences between ordinary sleep and lucid dreaming. Lucid dreams often occur during REM sleep, when the brain is similarly active as when awake.

Scientists have conducted various experiments to confirm the reality of lucid dreams, and they have shown that lucid dreamers are actually asleep when they experience their lucid dreams.

Tibetan Buddhism practices a form of conscious sleep in which the conscious mind remains awake while the body sleeps. This is similar to the concept of lucid dreaming, where the dreamer is conscious while asleep.

In summary, lucid dreaming is a scientifically researched phenomenon in which the dreamer is conscious while asleep and can influence the action of the dream. It is no longer considered a mysterious message, but an interesting field of research.

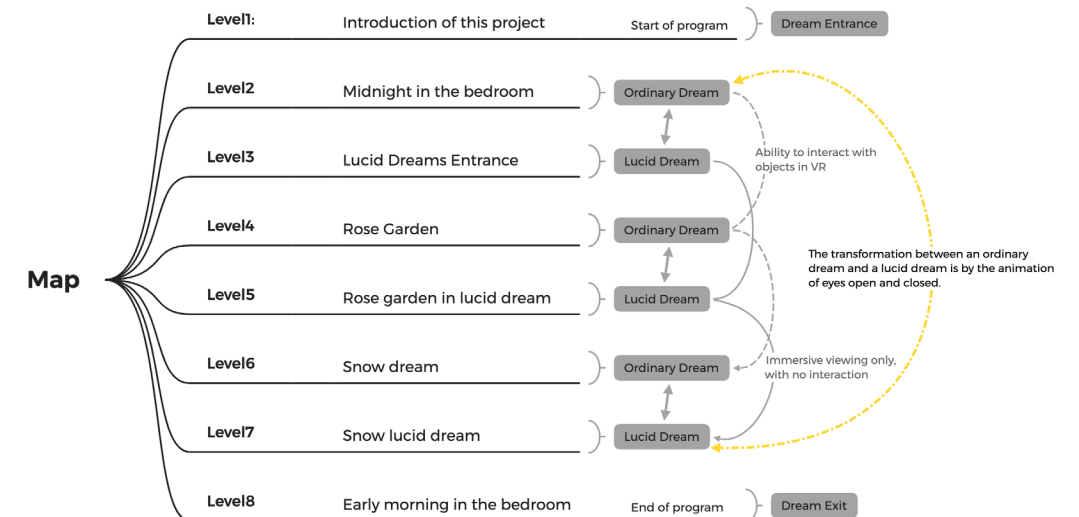


Creating the virtual scene

The VR project uses Unreal Engine versions 4.6 and 4.7 and is divided into eight levels, each designed to provide a unique experience within the virtual dream environment. These levels and their themes are as follows:

- **Level 1 - Introduction:** This level introduces the project.
- **Level 2 - Midnight in the Bedroom:** Set in a bedroom at midnight.
- **Level 3 - Lucid Dreams Entrance:** The entrance to lucid dreams.
- **Level 4 - Rose Garden:** A scene set in a rose garden.
- **Level 5 - Rose Garden in a Lucid Dream:** The same rose garden, but within a lucid dream.
- **Level 6 - Snow Dream:** A snowy dream environment.
- **Level 7 - Snow Lucid Dream:** The snowy dream environment, but in a lucid dream.
- **Level 8 - Early Morning in the Bedroom:** Back in the bedroom, early in the morning.

The entire project has a duration of approximately 10 to 12 minutes. The main scenes revolve around three themes: Bedroom, Rose Garden, and Snow. Each theme includes two scenes, one representing an ordinary dream and the other a lucid dream. The transition between scenes is accomplished through an animation that simulates the opening and closing of the dreamer's eyes, mimicking the natural state of the sleeper before entering sleep and upon waking. This technique aligns with the lucid dream viewing training method described in Chapter 2, allowing participants to experience the distinction between ordinary dreams and lucid dreams within similar scenarios.





An ultimately revealing sexual process is not necessary. The project's goal was to translate the feelings in the dream world into a visualised experience. The film *American Beauty* (Bauer 4 Apr. 2023) provided good inspiration to present this dream in a naked but not revealing way. *American Beauty* is a 1990 American film directed by Sam Mendes and Alan Ball. The film explores a middle-aged man experiencing unemployment, family crises and disappointment in himself, as his desire for youth and vitality is restored by his daughter's beautiful female classmate, who is in the midst of her mid-life crisis because of a young girl. The hero embarks on a journey of self-discovery as he pursues his desires and repairs his kinship.

An awe-inspiring moment in the film is the director's artistic way of capturing the male protagonist's imaginary maiden in his mind, hiding her naked body in a spray of flower petals, as these sex scenes are presented to the audience.

The image of Angela in the hero's fantasy in the film is that of a gorgeous blonde with a beautiful body. Admittedly this old film, when viewed through the lens of today, shows Angela as the customary objectification of women in Hollywood films of the Marilyn Monroe era, with the blonde always looking beautiful and unintelligent.

However, the film uses the girl's body soaked in roses, with red rose petals gushing from her chest. Red roses hold hidden and exciting romantic connotations; their language is passionate love, passion, love. In the film, the young girl's body is immersed beneath the red rose petals, perfectly covering her private parts, just as the rose petals bring about a void that the director makes a subtle suggestion of in an artistic way. The combination of J.'s lucid dream and this film creates a dreamscape of romance and emptiness.

Combining dream messages with film

Interaction

The VR glasses used in this project are the Oculus Quest 2 by Meta (formerly known as Facebook). The Oculus Quest 2 is a virtual reality headset developed by Meta. One of its main features is its Hand Tracking, which allows the user to control the interface and interact with virtual objects in the virtual environment without using a controller.

Instead, hand Tracking uses the headset's camera to track the user's hand movements, translate them into corresponding movements in the virtual environment, and grasp, select and manipulate objects in the virtual environment. Hand Tracking's virtual hands are displayed as transparent in the virtual environment, and a skin texture can be set to display the skin. One of the significant advantages of Hand Tracking over the controller

is the display of the virtual hand. When the controller displays a 3D hand model, it is necessary to load the model in advance, taking into account the gender and age of the user, which is significantly different between male and female hands. Hand Tracking tracks the shape of the user's hand through the camera and displays the shape of the user's hand in VR. This detail helps the user feel immersed after seeing their hand for the first time on the first level and enhances the user experience because everyone's hand is different. Hand Tracking was therefore chosen as the main feature for the interactive approach. A blue flashing ball is set up to prompt the user to interact with the virtual object and to take the next step. Once the blue flashing ball is found, the user can use their Hand to touch or interact with it according to the dream's content, e.g. opening doors, picking roses, opening curtains, interacting with snowmen, etc.

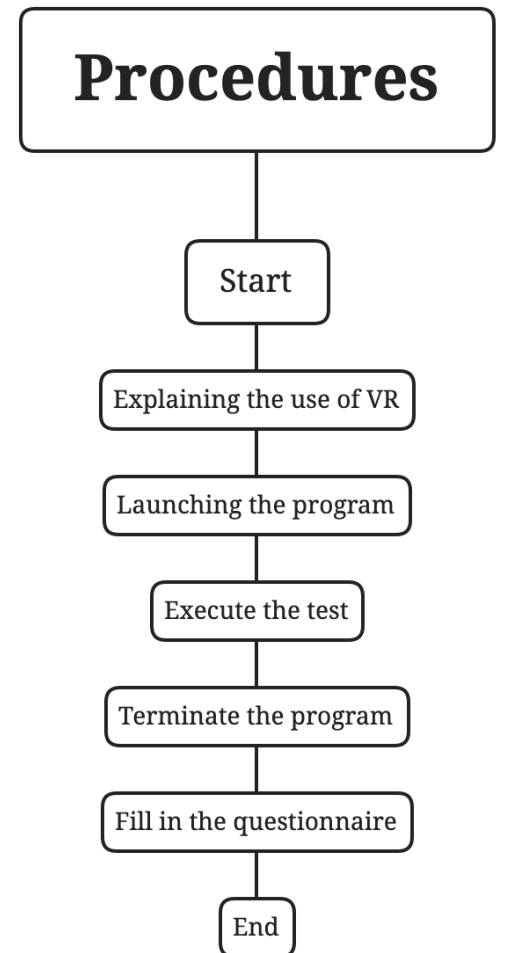


Exhibition

The project was part of an exhibition of master projects organized by the University of the Arts Bremen on board the exhibition ship Dauerwelle. The exhibition attracted a large number of visitors and the VR setup was designed to be easy to navigate and interactive. Here are some key details about the exhibition setup and user experience:

- **VR display:** The VR unit was suspended from top to bottom at a height of one meter above the floor. This arrangement facilitates access to and use of the VR equipment while creating an exhibition effect. The backdrop of purple gradient curtains creates a dreamy atmosphere and isolates the VR hardware from the surrounding exhibition environment.
- **Choice of VR device:** The project uses the Oculus Quest 2 VR headset. The Oculus Quest 2 was chosen because it does not require an external base station for tracking. Its built-in sensors precisely track the headset's position and controllers, simplifying setup and improving user comfort, and the Oculus Quest 2 is equipped with the Guardian system, which allows users to set up virtual boundaries to ensure safety during the VR experience.
- **User Experience:** The program was semi-experimental and semi-presentational. Participants were first introduced to the theme, purpose, and duration of the program. They were then helped to put on the Oculus Quest 2 headset, which provided hand-tracking, reducing the need for additional equipment and physical contact.
- **SAFETY MEASURES:** Since the exhibit is being held during a pandemic, minimizing physical contact is a top priority. Participants are discouraged from touching the VR device with their hands. The hand-tracking feature allows for interaction without direct contact. Sterilization procedures were implemented between users to ensure safety.
- **User Interaction:** Participants were trained on hand tracking and program topics through a virtual display. They were then guided through the different program levels one by one by a blue ball of light. During the VR experience, the program could be observed in real time through the display. Users with no prior gaming or VR experience received manual voice prompts during the VR experience.
- **Questionnaire:** After completing the VR experience, participants were asked to fill out a questionnaire to provide feedback. A total of 29 participants filled out the questionnaire out of approximately 50 users who used the program during the exhibition.

This setup and user experience allowed participants to engage with the program and provided valuable insights through the user feedback collected through the questionnaire.



Results

The study's findings suggest that it is feasible to demonstrate dream interactions through a VR device. The participants in the study, whether or not they had prior knowledge of lucid dreaming, were able to experience lucid dreaming through the VR program. The program successfully created immersive dream experiences and allowed participants to interact within the dream world. Additionally, participants developed an interest in lucid dreaming as a result of the program and expressed a desire to experience lucid dreaming in real life.

However, the extent to which participants could interpret the dream content varied, influenced by individual factors and how well they grasped the VR experience. For example, some participants did not realize that the rose garden scene represented a lucid sexual dream, indicating that the program's realism might be improved to enhance dream interpretation.

In the future, the use of VR in psychological treatment, such as exposure therapy and nightmare treatment, holds promise. The development of increasingly realistic 3D content creation methods for recreating real events in VR is also an exciting possibility. However, it is emphasized that creating VR content for therapeutic purposes should involve guidance from relevant experts and psychologists to ensure that it is ethically and therapeutically sound.