

Lucid Dreaming Created by Virtual Reality Technology

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Abstract

We know that dreams are different from reality. When you dream, we are limited in what we can do, unless we are able to achieve "lucid dreaming". lucid dreaming is not always possible, and it is difficult to achieve this state. Therefore, this paper attempts to use virtual reality technology and specific events to create lucid dreaming, try to circumvent the myriad of hazards and the pharmacological hallucination, experience completely immersive, real and convincing virtual reality (VR), and explore the relationship between virtual reality and lucid dreaming. This is a virtual reality experience space "worry-free space" designed by 57 college students majoring in landscape architecture through their understanding of "what is happiness" and the questionnaire which they completed. The virtual reality experience includes the independent tour of the virtual space, the independent selection of scenes, and the control of non-realistic interactive scenes in an awake state, so as to achieve the dream effect of realizing a lucid dreaming. After experience feedback, not all virtual spaces can play a positive role, but from the perspective of experience effect, virtual reality technology can become a good means of intervention. Virtual reality technology may replace lucid dreaming, which can be verified from the behavior and satisfaction of the experimenter, but the potential mechanisms behind virtual reality technology, such as synthetic lucid dreaming like experience, customized virtual reality scene design, interaction mode design, etc., especially virtual reality technology is more aggressive in intervening in dreams.

Keywords: Lucid Dreaming, Virtual Reality Technology (VR), Virtual Reality Scene Design

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Introduction

Virtual reality technology, as a new technology in the computer field that integrates a variety of science and technology, has involved many research and application fields, and is considered as an important development discipline in the 21st century and one of the important technologies that affect people's lives. Virtual reality technology integrates computer image processing technology, network multimedia and other technologies. Through the interaction between users and computers, it simulates the virtual environment, provides users and operators with a three-dimensional real architectural landscape map (MA Bohua 2020), and can realize the user's multi-sensory experience, giving people a sense of immersive. However, this feeling is very similar to the special dream "lucid dream". Therefore, the research on lucid dreams and virtual reality technology aims to create lucid dreams through virtual reality technology, use dreams to assist in solving problems that cannot be solved in reality, and achieve the effect of regulating emotions to achieve happiness.

In this study, 57 college students majoring in landscape architecture, through their understanding of "what is happiness" and the questionnaire they completed, used VR technology to design a virtual experience space "worry-free space" that can be decompressed. The whole study period is from June 2021 to December 2022. College students are selected as the research object because they are at the stage of physical and mental development, and their emotional changes are also the most abundant. In the process of research, we compared the survey data and created a virtual experience space. From the perspective of human dreams, we explored the commonalities between lucid dreams and virtual reality technology, taking the emotional experience of college students as the starting point, and provided theoretical reference for research in related fields.

Lucid Dreaming Theory Overview

Dream research has a history of nearly 100 years in the field of psychology. Researchers have put forward many theories and hypotheses to explain the principles, characteristics, functions and relevance of dreams to the real world. These rich dream research results may have an important reference for understanding the function and experience of virtual space, especially for a special dream state "lucid dream". Although there are still controversies about lucid dreams, the accepted definition of lucid dreams is: lucid dreams are those in which an individual can perceive his or her dream state while dreaming. In some cases, an individual can even control the emergence or occurrence of some things or contents in the dream (Tart, 1984; LaBerge, 1985). Under normal circumstances, lucid dreams rarely occur and are difficult to be detected or triggered by the dreamer. They can only be realized through training and mastering certain skills.

What is the meaning of "lucidity" of dreams? How does the brain achieve two states of "sleep" and "awake" at the same time? In this regard, Schenck and Mahowald (1996) showed that brain state separation is a very common phenomenon. The brain can achieve that part of the brain is sleeping while the other part is fully awake. Sleepwalking is an extreme example. Does a lucid dream have a state of consciousness? Researchers also put forward different views. The virtual reality model proposed by Edelman (1992) believes that conscious consciousness may consist of primary consciousness and secondary consciousness. Primary consciousness refers to the level of consciousness reached in ordinary dreams, and the waking state includes secondary consciousness (at this level, people's insight, abstract

concepts and consciousness awareness are stronger). The difference between ordinary dreams and lucid dreams reflects the difference between primary consciousness and advanced consciousness (Hobson, 2009a). Farthing (1992) also proposed two modes of self-consciousness in the sober state: primary consciousness and reflective consciousness. Among them, the former refers to the direct response to the current perception, thoughts and memory, and the latter refers to the thinking of self-conscious experience, belonging to the secondary level of consciousness. Both modes will appear in the state of consciousness when awake, while the lucid dreamer may experience the simultaneous existence of two kinds of consciousness in the lucid dream (Kozmova & Wolman, 2006). The two researchers divided consciousness into two categories: consciousness as awareness (phenomenological significance) and consciousness as strategic control (functional significance). Therefore, we can see that the characteristics of lucid dream state are sensory perception and control consciousness.

The functional results of lucid dreams have also received the attention of many researchers. For example, lucid dreams can effectively reduce the frequency of nightmares and reduce the intensity of nightmares (Abramovitch, 1995; Brylowski, 1990; Spormaker, van den Bout, & Meijer, 2003; Zadra & Pihl, 1997; Spormaker & van den Bout, 2006), and can be used for motor skill training (Erlacher & Schredl, 2004, 2010; Erlacher & Chapin, 2010). There is a significant correlation with creativity (Zink & Pietrowky, 2013), and certain results have also been obtained in the clinical field (Mota—Rolim & Araujo, 2013).

Virtual Reality Technology Theory Overview

Virtual Reality technology (VR for short), also known as spirit technology, is a comprehensive integrated technology integrating artificial intelligence, computer graphics, human-computer interface technology, multimedia technology, network technology, parallel computing technology and other technologies (Li Jie, 2009). It has four major features: 1, Multi-sensory. The so-called multi-sensory means that in addition to the visual perception of general computer technology, there are also auditory perception, force perception, tactile perception, motion perception, and even taste perception and olfactory perception. 2, Presence, also known as Immersion, refers to the degree to which users feel that they exist in the simulation environment as protagonists. 3, Interaction refers to the user's operability of objects in the simulation environment and the natural degree of feedback from the environment (including real-time). 4. Autonomy refers to the degree to which objects in the virtual environment act according to the laws of physics (Li Jie, 2009).

From a historical point of view, taking the time axis as a new dimension, VR has developed very rapidly, with many years of research results and products, and the immersion effect of VR experience is extremely significant, and its influence is increasingly widespread. From Figure 1, we can see that the immersive experience effect of VR is an evolutionary process from 0 to 4 levels, from no immersive effect to full immersive effect, which indicates that human senses can gradually realize complete separation from reality. This kind of experience is very similar to our feelings in dreams, so we try to use VR technology to realize lucid dreams.

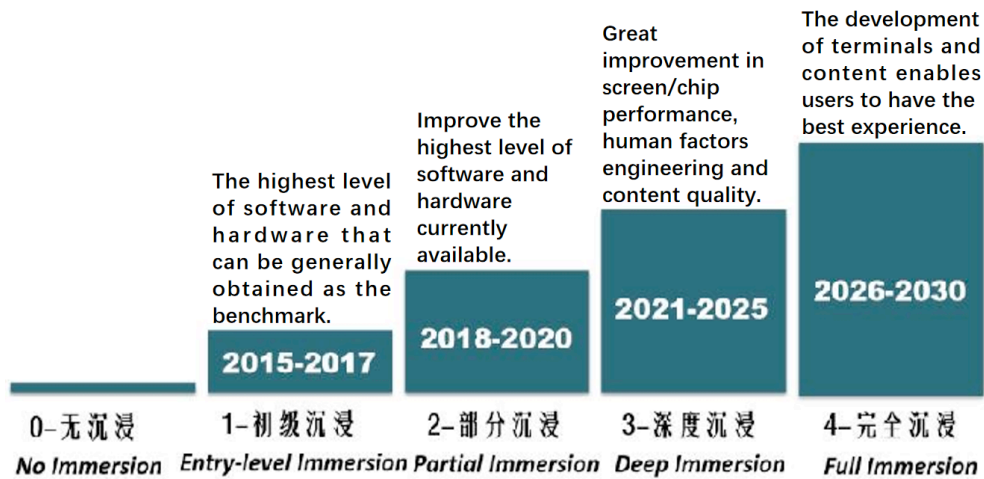


Figure 1: Development of immersive experience.

Lucid Dreaming and Virtual Reality Technology

They have very similar characteristics, but of course they also have different properties. From the perspective of characteristics, VR can achieve more. In addition, in Figure 2 of the relationship network, Lucid dreaming represents human consciousness, which is controlled by human autonomy. VR stands for Technology, the technology selected in the experiment. College student is the object of study (person), and these three forms a system. Students are both dreamers and experiencers, the most direct controller, and the ultimate beneficiaries.

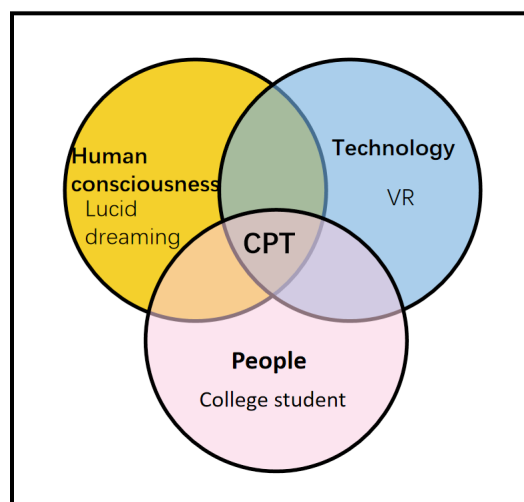


Figure 2: Relationship between lucid dreaming and VR (CPT)

From the above characteristics of VR and lucid dream, as shown in Figure 3, the Perception of lucid dream corresponds to VR's Multi-sensory and Immersion, while the Control consciousness corresponds to Interaction and Autonomy. Previous studies mainly include: First of all, although lucid dreams and VR belong to different fields, they have the same research directions. For example, lucid dreams and VR have the same efficacy and help in treating diseases, regulating emotions and education. However, when lucid dreams occur, people's body hardly moves, but VR operation requires real movement of the body. Secondly, the combination of the two can promote each other. 1, The sense of reality in dreams and the sense of identification with non-reality are conducive to the establishment of VR virtual

space. 2, VR training can promote the research of lucid dreams. For example: Virtual reality training of Lucid dreaming (Jarrod Gott et al., 2020).

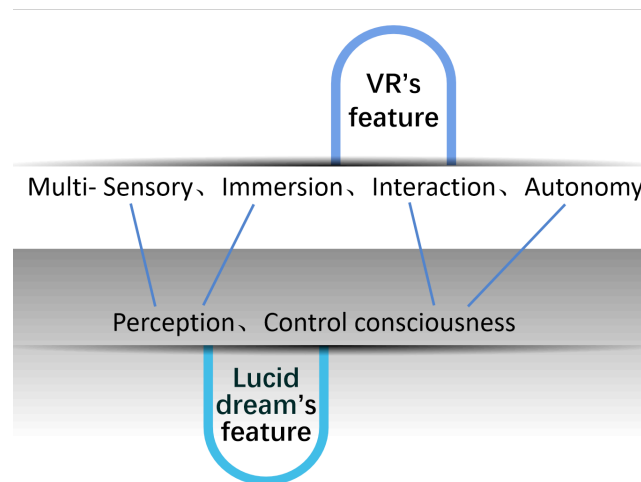


Figure 3: Similarities between the two characteristics

Method

(a) Participants and procedures

In the research of virtual reality experience space "worry-free space", it is mainly about the understanding of the decompression methods and space preferences of current college students, and the research of using VR technology to achieve happiness, involving students, teachers, and interviewed students. The main body of the project consists of 57 students, divided into 12 groups, with 4-5 students in each group. Teachers are mainly responsible for guiding in the project. In addition, in order to obtain effective information before production, each group is required to interview about 50 people (in order to obtain objective data, so we need to obtain extensive features in a large number), and the interviewees are college students from different majors and colleges.

The whole design process is divided into three parts. In the early stage of design, it is mainly to collect data, in the middle stage of design, it is to analyze data and modify, and in the later stage of design, it is to experience and discuss. In the process of design and production, we need some software and hardware to complete the virtual reality experience space, such as Sketchup, Lumion, MARS and other design software. In order to obtain more accurate data, each group of students will carry out preliminary data collection and questionnaire survey data collation before design and production. In the process of creation, the designer, according to the collected design points, imagines the state in the dream, and creates a virtual space that can fly freely. Finally, six of the most popular programs were selected from all the programs, and the participants were invited to have a space cruise experience.

(b) Data analysis

We use the principle of phenomenology to return the virtual dream to the basic design elements for research. The key points can be divided into color, shape, space, texture, etc. From the most popular group of schemes, the first data collected from the color is that the number of people who choose blue is the largest, the second is green, and the other color choices are relatively average, so the color tone of the worry solving space is mainly cold.

From the perspective of material texture, most students like wood, which is closer to nature, and a few choose glass and concrete. It can be seen that most people like natural and modern materials. From the shape and size of the space, more people choose multi-room and square space, which shows that college students like diversity and follow the characteristics of regularity. Secondly, they prefer outdoor sports venues, which also emphasizes the need for more interactive environments.

Conclusion

Our original intention is to create a dream experience space, so that the experience will be happy. Although not all space designs can meet everyone's preferences, it is surprising to find that the impact on the designer is significant. He can become both the creator of dreams and the experiencer. He can obtain happiness from it in the process of creation and realize the role of "relieving worries in space". 1, When designers use VR to create space, it is similar to the state in a lucid dream. In the process of creation, designers can do whatever they want, and their emotions are happy and free. If VR experiencers like the worry-free space they design very much, designers will be happier and realize their value. 2, According to the survey data, the types of space that college students like are: diverse, rich, interactive, close to nature, dreamy and surprising. 3, College students still like childhood games and use imagination to explain everything unknown, which is the source of happiness. 4, Lucid dream and VR can promote art design.

When we are faced with negative emotions, the virtual experience space created by VR technology can have a certain regulatory effect. It is a lucid dream that allows you to easily return to childhood and feel carefree life. The development of lucid dreams and VR technology in the future is still very large, especially the impact on artistic creation, which is very worthy of further research.

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References

- Abramovitch, H. (1995). The nightmare of returning home: A case of acute onset nightmare disorder treated by lucid dreaming. *Israel Journal of Psychiatry and Related Sciences*, 32 (2), 140-145.
- Brylowski, A. (1990). Nightmares in crisis: Clinical applications of lucid dreaming techniques. *Psychiatric Journal of the University of Ottawa*, 15(2), 79-84.
- Edelman, G. M. (1992). *Bright air, brilliant fire: On the matter of the mind*. New York: Basic Books.
- Erlacher, D., & Schredl, M. (2004). Required time for motor activities in lucid dreams. *Perceptual and Motor Skills*, 99, 1239–1242.
- Erlacher, D., & Chapin, H. (2010). Lucid dreaming: Neural virtual reality as a mechanism for performance enhancement. *International Journal of Dream Research*, 3(1), 7–10.
- Erlacher, D., & Schredl, M. (2010). Practicing a motor task in a lucid dream enhances subsequent performance: A pilot study. *The Sport Psychologist*, 24(2), 157-167.
- Farthing, W. G. (1992). *The Psychology of consciousness*. Englewood Cliffs, NJ: Prentice—Hall.
- Hobson, J. A. (2009a). The neurobiology of consciousness: Lucid dreaming wakes up. *International Journal of Dream Research*, 2 (2), 41-44.
- Jarrold Gott. (2020). Virtual reality training of lucid dreaming. *Philosophical Transactions of The Royal Society B Biological Sciences*, 20 (12).
- Kozmova, M., & Wolman, R. N. (2006). Self-awareness in dreaming. *Dreaming*, 16(3), 196-214.
- LaBerge, S. (1985). *Lucid dreaming*. N. Y. : Ballantine.
- Li Jie. (2009). History and future of virtual reality technology. *Heilongjiang Science and Technology Information*, 09 (26).
- Mota—Rolim, S. A., & Araujo, J. F. (2013). Neurobiology and clinical implications of lucid dreaming. *Medical hypotheses*, 81 (5), 751–756.
- MA Bohua. (2020). Design of VR technology based 3D integration simulation system for architectural landscape features. *Modern Electronics Technique*, 43, 153-156.
- Schenck, C. H. & Mahowald, M. W. (1996). REM sleep parasomnias. *Neurological Clinics*, 14, 697–720.
- Spoormaker, V. I., van den Bout, J., & Meijer, E. J. G. (2003). Lucid dreaming treatment for nightmares: A series of cases. *Dreaming*, 13 (3), 181-186.

Tart, C. T. (1984). Terminology in lucid dream research. *Lucidity Letter*, 3 (1), 82—84.

Zink, N., & Pietrowky, R. (2013). Relationship between lucid dreaming, creativity and dream characteristics. *International Journal of Dream Research*, 6 (2), 98—103.

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